

**GOVERNMENT POLYTECHNIC, MALKANGIRI**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

**LESSON PLAN**

| Discipline:<br>Mechanical Engineering              | Semester:<br>3rd                                                                                                                                                                                                                                                                                                    | Name of the Teaching Faculty: SATYABAN KOPE                                                                                                                       |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject:<br>Material Testing and Metallography Lab | No. of days/week class allotted<br>4                                                                                                                                                                                                                                                                                | Semester From date:<br>No. of Week: 15 To date:                                                                                                                   |
| Course Outcomes                                    | 1. to identify the type of material based on its grain structure<br>2. to learn the procedure for identifying the cracks in the material<br>3. to illustrate various material testing methods to determine mechanical properties such as yield stress, Ultimate stress, percentage elongation, Young's Modulus etc. |                                                                                                                                                                   |
| Week                                               | Class Day                                                                                                                                                                                                                                                                                                           | Theory/Practical Topics                                                                                                                                           |
| 1st                                                | 1st                                                                                                                                                                                                                                                                                                                 | Prepare a specimen and examine the microstructure of the Ferrous and Non-ferrous metals using the Metallurgical Microscope                                        |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Prepare a specimen and examine the microstructure of the Ferrous and Non-ferrous metals using the Metallurgical Microscope                                        |
| 2nd                                                | 1st                                                                                                                                                                                                                                                                                                                 | Prepare a specimen and examine the microstructure of the Ferrous and Non-ferrous metals using the Metallurgical Microscope                                        |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Detect the cracks in the specimen using (i) Visual inspection and ring test (ii) Die penetration test (iii) Magnetic particle test.                               |
| 3rd                                                | 1st                                                                                                                                                                                                                                                                                                                 | Detect the cracks in the specimen using (i) Visual inspection and ring test (ii) Die penetration test (iii) Magnetic particle test.                               |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Detect the cracks in the specimen using (i) Visual inspection and ring test (ii) Die penetration test (iii) Magnetic particle test.                               |
| 4th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel, brass, copper and aluminium                                 |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel, brass, copper and aluminium                                 |
| 5th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel, brass, copper and aluminium                                 |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel, brass, copper and aluminium                                 |
| 6th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Finding the resistance of materials to impact loads by Izod test and Charpy test                                                                                  |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Finding the resistance of materials to impact loads by Izod test and Charpy test                                                                                  |
| 7th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Finding the resistance of materials to impact loads by Izod test and Charpy test                                                                                  |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus and shear stress.                                          |
| 8th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus and shear stress.                                          |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus and shear stress.                                          |
| 9th                                                | 1st                                                                                                                                                                                                                                                                                                                 | Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus and shear stress.                                          |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Finding Young's Modulus of Elasticity, yield points, percentage elongation and percentage reduction in area, stress strain diagram plotting, tests on mild steel. |
| 10th                                               | 1st                                                                                                                                                                                                                                                                                                                 | Finding Young's Modulus of Elasticity, yield points, percentage elongation and percentage reduction in area, stress strain diagram plotting, tests on mild steel. |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Finding Young's Modulus of Elasticity, yield points, percentage elongation and percentage reduction in area, stress strain diagram plotting, tests on mild steel. |
| 11th                                               | 1st                                                                                                                                                                                                                                                                                                                 | Determination of modulus of rigidity, strain energy, shear stress and stiffness by load deflection method (Open & Closed coil spring)                             |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Determination of modulus of rigidity, strain energy, shear stress and stiffness by load deflection method (Open & Closed coil spring)                             |
| 12th                                               | 1st                                                                                                                                                                                                                                                                                                                 | Determination of modulus of rigidity, strain energy, shear stress and stiffness by load deflection method (Open & Closed coil spring)                             |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Determination of modulus of rigidity, strain energy, shear stress and stiffness by load deflection method (Open & Closed coil spring)                             |
| 13th                                               | 1st                                                                                                                                                                                                                                                                                                                 | Single or double Shear test on M.S. bar to finding the resistance of material to shear load.                                                                      |
|                                                    | 2nd                                                                                                                                                                                                                                                                                                                 | Single or double Shear test on M.S. bar to finding the resistance of material to shear load.                                                                      |

