

## MATERIAL TESTING LABORATORY

Practicals : 3 Periods/Week

Sessional marks : 40

Semester End Exam.: 3 Hrs.

Semester End Exam. marks : 60

Credits : 2

### Course objectives:

- To study the behaviour of materials like steel, wood, concrete etc under direct tension, compression, shear, torsion and bending by conducting relevant tests
- To find young's modulus, modulus of rigidity, hardness, impact resistance of the given materials like steel, wood by conducting relevant tests
- To determine the modulus of rigidity of the spring
- To conduct tests like Normal consistency and fineness of cement, Initial setting and final setting time of cement, Specific gravity, soundness, Compressive strength of Cement to find the quality of cement
- To determine the workability of fresh concrete using Slump cone, Compaction factor, Vee-Bee consistometer tests
- To study the Bulking characteristics of fine aggregate and to determine the Specific gravity of fine and coarse aggregates and fineness modulus of fine aggregate and coarse aggregate.
- To determine the compressive strength of concrete & split tensile strength of concrete.
- To determine the modulus of Elasticity of concrete by conducting compression test on cylinders.
- To demonstrate the Non-destructive testing on concrete and concrete mix design (IS method)

### Course outcomes:

- Behavior of materials like steel, wood, concrete etc under direct tension, compression, shear, torsion and bending
- Finding properties of materials like young's modulus, modulus of rigidity, hardness, impact resistance
- Finding the quality of cement
- fresh concrete workability properties to judge the suitability of concrete for the field conditions
- Physical properties of concrete making materials like cement, fine aggregate and coarse aggregate to judge suitability for making concrete
- Know the quality of concrete i.e compressive, tensile strength of concrete and also by using non destructive testing methods.

***Note: A minimum of 6 experiments from PART-A and 6-experiments from PART-B shall be done and recorded***

### PART-A

1. Study of stress-strain characteristics of mild steel bars by UTM.
2. Study of stress-strain characteristics of HYSD bars by UTM.
3. Determination of modulus of elasticity of the material of the beam by conducting bending test on simply supported beam.
4. Determination of modulus of rigidity by conducting torsion test on solid circular shaft.
5. Determination of hardness of the given material by Brinell's/Vicker's/ Rockwell hardness test.
6. Determination of impact strength of the given material by conducting Charpy/Izod test
7. Determination of ultimate shear strength of steel by conducting direct shear test.
8. Determination of modulus of rigidity of the material of closely coiled helical spring.

9. Determination of compressive strength of wood with grain parallel / perpendicular to loading.

**PART-B**

1. Determination of (a) Normal consistency of cement (b) Fineness of cement using 90 microns IS sieve.
2. Determination of Initial setting and final setting time of cement.
3. Determination of (a) Specific gravity of cement (b) soundness of cement.
4. Determination of Fineness modulus of (a) Fine aggregate (b) Coarse aggregate.
5. Determination of workability of concrete by conducting Slump cone test.
6. Determination of workability of concrete by conducting Compaction factor / Vee-Bee consistometer test
7. Determination of (a) Cube compressive strength (b) Split tensile strength of concrete.
8. Determination of modulus of elasticity of concrete by conducting compression test on concrete cylinder
9. Determination of Bulk density and Specific gravity of (a) fine aggregate (b) coarse aggregates.
10. Determination of Bulking of fine aggregate.
11. Non-destructive test on concrete using Rebound Hammer / Ultrasonic Tester.