3. **Fluid Mechanics,** John F.Douglas, Janul and M.Gasiosek and john A.Swaffield, Pearson Education Asia, 5th ed., 2006

4. **Fluid Mechanics and Fluid Power Engineering,** Kumar.D.S, Kataria and Sons., 2004

5. **Fluid Mechanics** -, Merle C. Potter, Elaine P.Scott. Cengage learning

METALLOGRAPHY AND MATERIAL TESTING LABORATORY

Sub Code	**: 10MEL 37A / 47A**	**IA Marks**	**: 25**
Hrs/week	**: 03**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 48**	**Exam Marks**	**: 50**

PART – A

1. Preparation of specimen for Metallograpic examination of different engineering materials. Identification of microstructures of plain carbon steel, tool steel, gray C.I, SG iron, Brass, Bronze & composites.
2. Heat treatment: Annealing, normalizing, hardening and tempering of steel. Hardness studies of heat-treated samples.
3. To study the wear characteristics of ferrous, non-ferrous and composite materials for different parameters.
4. Non-destructive test experiments like,
   (a). Ultrasonic flaw detection
   (b). Magnetic crack detection
   (c). Dye penetration testing. To study the defects of Cast and Welded specimens

PART – B

1. Tensile, shear and compression tests of metallic and non metallic specimens using Universal Testing Machine
2. Torsion Test
3. Bending Test on metallic and nonmetallic specimens.
4. Izod and Charpy Tests on M.S, C.I Specimen.
5. Brinell, Rockwell and Vickers's Hardness test.
6. Fatigue Test.

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Scheme of Examination:

ONE question from part -A:	**20** Marks
ONE question from part -B:	**20** Marks
Viva -Voice:	**10** Marks
Total :	**50** Marks

MECHANICAL MEASUREMENTS AND METROLOGY LABORATORY

Sub Code	**: 10MEL 37B / 47B**	**IA Marks**	**: 25**
Hrs/week	**: 03**	**Exam Hours**	**: 03**
Total Lecture Hrs	**: 48**	**Exam Marks**	**: 50**

PART-A: MECHANICAL MEASUREMENTS

1. Calibration of Pressure Gauge
2. Calibration of Thermocouple
3. Calibration of LVDT
4. Calibration of Load cell
5. Determination of modulus of elasticity of a mild steel specimen using strain gauges.

PART-B: METROLOGY

1. Measurements using Optical Projector / Toolmaker Microscope.
2. Measurement of angle using Sine Center / Sine bar / bevel protractor
3. Measurement of alignment using Autocollimator / Roller set
4. Measurement of cutting tool forces using
   a) Lathe tool Dynamometer
   b) Drill tool Dynamometer.
5. Measurement of Screw thread Parameters using Two wire or Three-wire method.
6. Measurements of Surface roughness, Using Tally Surf/Mechanical Comparator
7. Measurement of gear tooth profile using gear tooth vernier /Gear tooth micrometer
8. Calibration of Micrometer using slip gauges
9. Measurement using Optical Flats

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