

ENGINEERING METROLOGY LABORATORY

Description of the Laboratory:

Engineering Metrology deals with applications of measurement science in manufacturing process. It provides an accurate means of assessing the suitability of measuring instruments, their calibration, and the quality control of various components. These days, metrological error has a far greater impact on cost than in the past. Hence, knowledge in this domain ensures hassle free manufacturing process. It embraces both experimental and theoretical measurements and determinations at any level of uncertainty in any field of Science and Technology. A product that is not manufactured according to metrological specifications will have to sustain heavy costs to comply with the specifications later. Metrology Lab provides a strong foundation to the students aspiring to pursue their career in Industrial Engineering and shop floor control. The experiments are replete with various kinds of tools/instruments, measurement methods, calibration, evaluation of accuracy and precision of various components. Accordingly, instruments such as Vernier Calipers, Micrometer, Bevel Protractor, Gear Tooth Vernier, Lever Dial Gauge, GO-NO Gauges, Profile Projector, Electric Comparator, Surface Roughness Tester etc are used. The calibration exercises enable them to find the errors involved in the measurement process.

List of Experiments:

1. (a) Calibration of Vernier Calipers, Micrometer, Vernier Height Gauge, Dial Gauge and measurement of dimensions of components
(b) Measurement of dimensions of a part using limit gauges
2. (a) Measurement of internal bores by dial bore indicators
(b) Measurement of coordinates of a jig plate
(c) Measurement of radius of curvature of a given ring
3. (a) Measurement of angle and taper by using Bevel protractor, Sine bars
(b) Measurement of angle of Taper plug gauge, Taper ring gauge, V- groove
4. Measurement of gear elements by using Gear Tooth Vernier
5. (a) Measurement of screw elements by using Tool Makers Microscope
(b) Measurement of screw elements by using Profilometer

- (c) Measurement of effective diameter of an external thread by using Two Wire/Three wire method
6. (a) Measurement of straightness and flatness using spirit level and Autocollimator
(b) Measurement of surface roughness using surface roughness tester
7. Checking the limits of dimensional tolerances using electrical and optical comparators
8. Alignment Test on Lathe and Milling machines and measurement of the Resultant force acting on the tool using Tool Dynamometers

List of Equipment:

- Tool maker's Microscope
- Surface Roughness Tester
- Slip Gauges – Set of 87 pieces
- Autocollimator
- Profile Projector
- Digital Read Out System
- Electrical Comparator
- Metrology Instruments
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Photographs of the Lab/Equipment:



Sign Bar Apparatus



Vernier Height Gauge



Electronic Comparator



Mechanical Comparator



Surface Roughness Tester



Bevel Protractor