

10 ME 322 ENGINEERING METROLOGY
III B.Tech II Semester
(with effect from the academic year 2012-2013)

Lectures/Week : 4 Hrs
University Exam: 3 Hrs

Credits : 4
Sessional Marks: 40
End Examination Marks: 60

UNIT – I

Introduction to Metrology : Line and end standards, concept of tolerance. Interchangeability and selective assembly. Limits and fits - systems of limits and fits according to Indian standards and ISO standards. Limit gauges- Taylors principles- Gauge tolerance and wear allowance - Numerical problems in limits & fits, gauge design. Manufacture and use of slip gauges.

UNIT – II

Angle Measurement : Angle gauges, Protractors, Levels, Clinometers and Sine bar. Profile projector, Autocollimator, Angle Dekkor and Tool maker's Microcope. Straightness, Flatness, Squareness and Roundness Testing. Application of slip gauges, rollers and balls in testing taper.

Comparators: Mechanical, Optical, Electrical and Pneumatic Comparators.

UNIT – III

Interferometer : Interference of light, optical flat and sources of light, lasers. NPL flatness and gauge length interferometers.

Surface Finish: Importance, Elements of surface texture, R_a , R_t & R_z and sampling length. Bearing area curve and form factor. Instruments for measuring Surface Roughness – Tomlinson surface meter, Talysurf, piezoelectric instruments. Plastic Replica method.

UNIT – IV

Screw Thread Measurement: Pitch and angle errors, concept of VED, measurement of major, minor and effective diameters(wire methods).

Gear Measurement: Nomenclature, Involute Form Tester, Rolling Gear Tester, Tooth thickness measurement- Chordal thickness and Base Tangent method.

Alignment tests on Lathe, Radial Drilling machine and Milling machine.

UNIT – V

Introduction to Inspection and Quality Control, Objectives of Statistical Quality Control, Control charts for variables: \bar{X} and R charts, Process Capability, Specification limits and Control limits, Natural tolerance limits.

Control Charts for Attributes: p chart, C chart and U chart.

Acceptance Sampling Plans for Attributes, Types of Sampling Plans, Advantages and disadvantages of Sampling Plans, OC Curve, Characteristics of OC Curve.

TEXT BOOKS:

1. A Text Book of Engineering Metrology – R.K.Jain
2. Modern Machining Process - P.C.Pandey & H.S.Shan

REFERENCES:

1. Engineering Metrology - Mahajan
2. Production Technology - HMT