ELECTIVE I -ME- 5005 (2) METROLOGY & INSPECTION

Unit 1 Introduction to metrology: Definition, types, need of inspection, terminologies, methods of measurement, selection of instruments, measurement errors, units,Measurement standards, calibration, statistical concepts in metrology Linear metrology: Steel rule, calipers, vernier caliper, vernier height gauge, vernier depth gauge, micrometers, universal caliper

Unit 2 Limits fits and tolerances : Interchangeability, selective assembly, limits, fit and tolerances, limit gauging, design of limit gauges, computer aided tolerancing

Measurement of straightness, flatness, squareness, parallelism, roundness and cylindricity, non-contact profiling systems

Unit 3 Measurement of surface finish: Introduction, terminology, specifying roughness on drawings, surface roughness parameters, factors affecting surface roughness, ideal surface roughness, roughness measurement methods, precautions in measurement, surface microscopy, surface finish softwares.

Screw thread metrology: Introduction, screw thread terminology, screw thread measurement.

Unit 4 Gear measurement: Introduction, types of gears, gear terminology, errors in gears, advanced measurement of spur gear.

Miscellaneous measurements: Taper measurement, angle measurement, radius measurement

Interferometry: Principle of interference, interference bands, interference patterns, flatness interferometer, Gauge length interferometer

Unit 5 Comparator: Features of comparators, classification of comparators, different comparators, advanced comparators, thread comparators.Advanced Metrology : Advanced measuring machines, CNC systems, Laser vision, In-process gauging, 3D metrology, metrology softwares

References :

1. Engineering Metrology - K.J. Hume, Macdonald and Co.(publisher) London
2. The Springer handbook of metrology and Testing, Czichos (Ed), 2011
3. The Metrology Hand book- Jay. L.Bucher (ed), American Society for Quality, 2004
4. Industrial Metrology - Smith GT, 2002,Spinger
5. Hand book of industrial metrology - John W. Greve, Frank W. Wilson,PHI - New Delhi
6. Engineering Metrology - D.M.Anthony,Pergamon Press
7. Dimensional Metrology - Khare MK, OXFORD-IBH Publishers