

AMMT11 METROLOGY AND MEASUREMENTS

UNIT-1 BASICS OF METROLOGY

- 1.1 Introduction to Metrology- Need- Elements- Work piece,
- 1.2 Instruments- Persons- Environment- their effect on Precision and Accuracy
- 1.3 Errors- Errors in Measurements- Types- Control- Types of standards.

UNIT-2 LINEAR AND ANGULAR MEASUREMENTS

- 2.1 Linear Measuring Instruments- Evolution- Types
- 2.2 Classification- Limit gauges- gauge design- terminology- procedure
- 2.3 Concepts of interchange ability and selective assembly
- 2.4 Angular measuring instruments- Types
- 2.5 Bevel protractor clinometers angle gauges, spirit levels sine bar
- 2.6 Angle alignment telescope- Autocollimator- Applications.

UNIT-3 ADVANCES IN METROLOGY

- 3.1 Basic concept of lasers Advantages of lasers- laser Interferometers- types
- 3.2 DC and AC Lasers interferometer- Applications- Straightness- Alignment.
- 3.3 Basic concept of CMM- Types of CMM- Constructional features- Probes- Accessories
- 3.4 Software- Applications- Basic concepts of Machine Vision System- Element- Applications.

UNIT-4 FORM MEASUREMENT

- 4.1 Principles and Methods of straightness- Flatness measurement
- 4.2 Thread measurement, gear measurement, surface finish measurement,
- 4.3 Roundness measurement- Applications.

UNIT-5 MEASUREMENT OF POWER, FLOW AND TEMPERATURE

- 5.1 Force, torque, power- mechanical, Pneumatic, Hydraulic and Electrical type.
- 5.2 Flow measurement: Venturimeter, Orifice meter, rotameter, pitot tube
- 5.3 Temperature: bimetallic strip, thermocouples, electrical resistance thermometer
- 5.4 Reliability and Calibration – Readability and Reliability.

References Books:

1. Shot bolt, “Metrology for Engineers”, McGraw Hill, 1990.
2. Backwith, Marangoni, Lienhard, “Mechanical Measurements”, Pearson Education , 2006.