AMPR14 ENGINEERING 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.