## UNIT I

### Chapter 1 : Introduction to Metrology 1-1 to 1-10

**Syllabus :** Definition of metrology, objectives of metrology. Categories of metrology, scientific metrology, Industrial metrology, Legal metrology. Need of inspection, Precision, Accuracy, Sensitivity, Readability, Calibration, Traceability, and Reproducibility. Sources of errors, Factors affecting accuracy. Selection of instrument, Precautions while using an instruments for getting higher precision and accuracy. Concept of least count of measuring Instrument.


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## UNIT II

### Chapter 2 : Standards and Comparators 2-1 to 2-17

**Syllabus :** Definition and introduction to line Standard, end standard, Wavelength standard and their comparison. Slip gauge and its accessories. Definition and Requirement of good comparator, Classification, use of comparators. Construction and Working principle of comparators Dial indicator, Sigma Comparator, Pneumatic comparator- high pressure differential type ,Relative advantages and disadvantages.


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## UNIT III

**Chapter 3 : Limits, Fits, Tolerances and Gauges 3-1 to 3-15**

**Syllabus :** Concept of Limits and Fits, deviation and Tolerances. Basic Terminology, Selective Assembly, Interchangeability. Indian standard (IS 919-1993) Fits, types of fits, Hole and Shaft Basis System, guide for selection of fit. ISO system of limit and fit,(Numerical on finding the limit and tolerances of hole and shaft assembly). Gauges : Limit gauges. Taylors principle of gauge design Plug, Ring Gauges, snap gauge, adjustable snap gauge.

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## UNIT IV

**Chapter 4 : Screw thread Measurements and Gear Measurement 4-1 to 4-19**

**Syllabus :**

**Screw thread Measurements** : Screw thread terminology, Errors in threads and Pitch Measurement of different elements such as major diameter, minor diameter, effective diameter, pitch diameter, Best size of wire Two wire method, Thread gauge micrometer. Working principle of floating carriage micrometer. Introduction to Tool Maker's Microscope, applications and working principle.

**Gear Measurement** : Analytical and functional inspection of Gear, Measurement of tooth thickness by constant chord method and base tangent Method by Gear Rolling tester / Parkinson's Gear Tester. Measurement of tooth thickness by Gear tooth Vernier and Profile projector Errors in gears such as backlash, run out.

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## UNIT V


**Chapter 5 : Linear and Angular Measurement 5-1 to 5-24**


**Syllabus :**

Concept of linear measurement and its instruments: surface plate, V-block, calipers, combination set, depth gauge, vernier instruments, micrometer instruments, slip gauges.(Refer Chapter 2),Concept of angular measurement. Instruments for angular Measurements. Use and working of universal bevel protractor, sine bar, spirit level. Principle of Working of Clinometers, Angle Gauges (With Numerical on Setting of Angle Gauges), Angle dekkor as an angular comparator.


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**UNIT VI**


**Chapter 6 : Other Measurements 6-1 to 6-23**


**Syllabus :**

Primary and secondary texture, terminology of surface texture as per IS 3073-1967, CLA, Ra, RMS, Rz values and their interpretation, Symbol for designating surface finish on drawing. Various techniques of qualitative analysis, working principle of stylus probe type instruments, Surface Roughness Tester, Interferometry. Parallelism, Straightness, Squareness, roundness, run out, alignment tests of Lathe and Drilling machine tools as per IS standard Flatness testing using Monochromatic light source with optical flat, Introduction to CMM.


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