

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E. SEMESTER : IV

### MANUFACTURING ENGINEERING

Subject Name: **METROLOGY AND COMPUTER AIDED INSPECTION**

| Sr. No. | Course Contents  |
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| 1.      | <b>General Concepts of Measurement:</b><br>Definition – Standards of measurement – Errors in measurement – Interchangeability and Selective assembly – Accuracy and Precision – Calibration of instruments – Linear measurement, Angular measurement |
| 2.      | <b>Measurement of Surface Finish and Measuring Machines:</b><br>Definitions – Types of Surface Texture: Surface Roughness Measurement Methods- Comparison, Profilometer, 3D Surface Roughness Measurement – Instruments.                             |
| 3.      | <b>Interferometry:</b><br>Interferometry – Introduction, Principles of light interference – Interferometers – Measurement and Calibration – Laser Interferometry.  |
| 4.      | <b>Computer Aided and Laser Metrology:</b><br>Tool Makers Microscope – Microhite – Co – Ordinate measuring machine – Applications – Laser Micrometer, Laser Scanning gauge, Non contact and in-process inspection, Vision system.                    |
| 5.      | <b>Image Processing:</b><br>Overview, Computer imaging systems, Image Analysis, Preprocessing, Human vision system, Image model, Image enhancement, gray scale models, histogram models, Image Transforms  |
| 6.      | <b>Computer Integrated Quality Assurance</b><br>Total quality control - quality assurance - Zero defects-POKA-YOKE Statistical evaluation of data using  |

#### Text Book:

1. GUPTA, I.C, “A Text Book of engineering metrology”, Dhanpat Rai and Sons, 1996.

#### References:

1. G.N.GALYER F.W. and C.R.SHOTBOLT, “Metrology for engineers”, ELBS, 1990.
2. GRAHAM T.SMITH, “Industrial Metrology”, Springer, 2002
3. “ASTE Handbook of Industries Metrology”, Prentice Hall of India Ltd., 1992.
4. R.K.RAJPUT, “Engineering Metrology and Instrumentations”, Kataria & Sons Publishers, 2001.
5. MILAN SONKA, VACLAV HLAVAC and ROGER BOYLE, “Image Processing, Analysis, and Machine Vision”, Cengage-Engineering; 3 edition (March 19, 2007).