METROLOGY, QUALITY CONTROL & REALIABILITY

Module I **(12 hours)**

Principles of Measurements, Line and End & optical Standards, Calibration, accuracy and Precision, Random error and systemic error.

Measurement of Surface Roughness, Screw Thread and Gears.

Limits, Fits and Gauges, Assembly by full, partial and group interchangeability, geometric tolerances.

Measurement of straightness, Flatness and circularity.

Module II **(14 hours)**

Some useful Probability Distribution, Testing of hypothesis, type I and type II errors, control limit theorem.

Causes of Variation, standard error of mean, process capability, PCR, RPI, Natural tolerance Limits, Specification Limits, Trial and Revised control Limits, Rational subgroups, Control charts for variable (X,R,S, CUSUM, EWMA), Control charts for fraction, non-conforming control charts for non-conformation.

Design of single sampling plan. Double, multiple and sequential sampling plans, O.C. curve, AOQ, AOQL,

Taguchi's Loss function, Orthogonal Arrays, Linear Graphs, parametric design, signal-to noise Ratio, ANOVA, TQM, Taguchi, ISO 9000, ZIT, Quality circle.

Module-III **(10 hours)**

Definition, bath-tub-curve, system reliability, reliability improvement, maintainability and availability, Availability of single repairable system using Markov model, Life tests, acceptance sampling plan based on life tests, Sequential acceptance sampling plan based on MTTF & MTBF.

Test Books

1. Engineering Metrology,R.K. Jain, Khanna Publisher, Delhi
2. Quality control and Application ,B.L. Hansen and P.M. Ghare, Prentice Hall of India.
3. Reliability Engg. And Terotechnology , A.K. Gupta, Macmillan India.
4. Taguchi methods Explained Practical steps to Robust design T.P. Bagchi, PHI

Reference Books

1. A text book of Engineering Metrology I.C. Gupta, Dhanpat Rai & sons, Delhi.
2. E.L. Grant and R.S. Leveaworth, Statistical quality Control", 7e, mc-Graw Hill.
3. Introduction to Statistical Quality control, D.C. Montgonery, John Wiley & sons.
4. Introduction to /reliability and Maitainability Engg E. Ebeling, MC-Graw Hill.
5. Statistical Quality Control, M. Mahajan, Dhanpat Rai & Sons.
6. Statistical Process Control and Improvement, A. Mitra, Pearson.