

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

MECHATRONICS ENGINEERING

Subject Name: **QUALITY ASSURANCE & RELIABILITY**

Sr. No.	Course Contents	Total Hrs
1.	QUALITY Quality: Definition, History, Importance, Cost of Quality, Approaches of Quality Management, Hierarchy of Quality management: Inspection & Test, Quality Control, Quality Assurance, Total Quality Management	05
2.	Statistical Quality Control SQC tools, Benefits of SQC, Concept of variation, Assignable & Chance causes, Attributes & variables, Frequency distribution curve & its types. Normal Distribution curve, Problems on FD curve & ND curve. Control chart for variable: Definition, Formulae & its problems. Control chart patterns, Process capability. Problems on \bar{x} & R chart and Process capability. Control chart for attribute: Definition, Formulae & its problems. Problems on p, c charts. Sampling: Definition, types of sampling, importance, benefits and limitations of sampling	10
3.	QUALITY MANAGEMENT SYSTEMS Quality Assurance (QA): Introduction, Definition, Management principles in QA, Forms of QA, QA in different stages. Quality planning, QA program, QA aspect, Quality in material management, Vendor selection & development. ISO: Introduction, ISO 9000 series of standard, ISO 9001 clauses, Registration process, Benefits of ISO. ISO 9001 clauses, Registration process, Benefits of ISO. Quality survey: Scope, Types of audit, inspection methods, Quality budget, Vendor Quality Rating. Total Quality Management: Definition, Models of TQM, Elements of TQM, Principles of TQM. Deming's approach, PDCA cycle, Juran's approach, JIT, Training for Quality management. Quality Improvement Programme: Histogram, Charts, Brain-storming, Cause & Effect diagram, Pareto analysis. Quality Circle: Quality Circle structure, Its operation, Characteristics of Quality Circle, Basic problem solving techniques. Introduction to Six Sigma and Taguchi concepts.	10
4.	RELIABILITY CONCEPTS Elements of probability, Reliability engineering fundamentals, Failure data analysis and examples, Failure rate, Failure density, Probability of failure, Mortality rate, Mean time to failure, Reliability in terms of Hazard rate and Failure Density, examples, Useful life and wear out phase of a system, Concept of burn period. Hazard Models, Conditional Probabilities and examples, Multiplication rule and examples, Bayes theorem and examples	10
5.	SYSTEM RELIABILITY and IMPROVEMENT Reliability of series and parallel connected systems and examples, Logic diagrams, An r-out of -n structures, Improvement of components, Element Redundancy, Unit redundancy, Standby redundancy	05

References:

1.	L.S.Srinath Reliability Engineering Affiliated East West Press
2.	Seymour Lipschutz Schaums outline of theory & problems of Probability SI (Metric) Edition 1981. Tata McGraw-Hill Publishing Co. Ltd.
3.	M. Mahajan Statistical Quality Control Dhanpat Rai & Co. (P) Ltd.
4.	Hopper A. G. Basic Statistical Quality Control Tata McGraw-Hill Publishing Co. Ltd.
5.	K.C.Arora Total Quality Management S.K.Kataria & Sons
6.	Dale Besterfield, Carol Besterfield, Glen H. Besterfield, Mary Besterfield Total Quality Management Pearson Education Inc., First Indian Reprint 2001.
7.	Mohamad Zairi Total Quality Management for Engineers Gulf Publishing Company 1991.
8.	Phillip J. Ross Taguchi Techniques for Quality Engineering McGraw Hill Book Co.
9.	E Balagurusami Reliability Engineering Tata McGraw Hill
10.	David Hoyle ISO9000 Quality Systems Handbook Butterworth-Heinemann Publicatins