

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHENICAL ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Quality and Reliability Engineering**
(Department Elective - I)

Subject Code: **171906**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	2	0	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Introduction: Quality – Concept, Different Definitions and Dimensions, Inspection, Quality Control, Quality Assurance and Quality Management, Quality as Wining Strategy, Views of different Quality Gurus.	02
2.	Total Quality Management TQM): Introduction, Definitions and Principles of Operation, Tools and Techniques, such as, Quality Circles, 5 S Practice, Total Quality Control (TQC), Total Employee Involvement (TEI), Problem Solving Process, Quality Function Deployment (QFD), Failure Mode and Effect analysis (FMEA), Fault Tree Analysis (FTA), Kizen, Poka-Yoke, 7QC Tools, PDCA Cycle, 7 New Quality Improvement Tools, TQM Implementation and Limitations.	10
3.	Introduction to Design of Experiments: Introduction , Methods, Taguchi approach, Achieving robust design, Steps in experimental design	03
4.	Just –in –Time and Quality Management: Introduction to JIT production system, KANBAN system, JIT and Quality Production.	03
5.	Introduction to Total Productive Maintenance (TPM): Introduction, Content, Methods and Advantages	03
6.	Introduction to ISO 9000, ISO 14000 and QS 9000: Basic Concepts, Scope, Implementation, Benefits, Implantation Barriers	03

7.	Contemporary Trends: Concurrent Engineering, Lean Manufacturing, Agile Manufacturing, World Class Manufacturing, Cost of Quality (COQ) system, Bench Marking, Business Process Re-engineering, Six Sigma - <i>Basic Concept, Principle, Methodology, Implementation, Scope, Advantages and Limitation of all as applicable.</i>	08
8.	Introduction to Probability Theory: Fundamental laws of probability, Random variables; Probability distribution function; Discrete and continuous distribution; Histogram and Normal distribution curve, Mean, variance and standard deviation of a distribution function. Random samples	03
9.	Reliability Concepts: Reliability engineering fundamentals; Failure data analysis; Failure rate; mortality curve; Concept of burn in period; Useful life and wear out phase of a system; Mean time to failure (MTTF); Mean time between failure, (MTBF) and mean time to repair (MTTR); Reliability in terms of Hazard rate and failure density, Conditional probability and multiplication rules.	10

Term Work:

The term work shall be based on the topics mentioned above.

Practical / Oral:

The candidate shall be examined on the basis of term-work.

Text Books:

1. Quality Assurance and Total Quality Management (ISO 9000, QS 9000 ISO 14000) by K C Jain and A K Chitale, Khanna Publishers
2. Statistical Quality Control by M. Mahajan, Dhanpat Rai & Co. (P) Ltd.
3. Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India
4. Total Quality Management by Dale H. Besterfield, *Carol Besterfield-Michna, Glen H. Besterfield and Mary Besterfield-Sacre, Pearson Educaiton*
5. Total Quality Management – Dr. S. Kumar, Laxmi Publication Pvt. Ltd.
6. Reliability Engineering by Srinath L. S., Affiliated East West Press.

Reference Books:

1. Total Quality Management by K C Arora, S K Kataria & Sons
2. Statistical Quality Control by Eugene L. Grant and Richard S. Leavenworth, Tata McGraw-Hill Publishing Company Ltd.
3. Total Quality Management: Poornima M. Charantimath, Pearson education(Singapore) Pte. Ltd.
4. Managing for Total Quality: N. Logothetis, Prentice Hall of India Pvt. Ltd.
5. Competitive Manufacturing Management : John M. Nicholas, Mcgraw Hill
6. Managing Quality : Barrie G. Dole, Blackwell publishing
7. TQM – an integrated approach – Samunel K Ho, Crest publishing House.
8. Probability and statistics for Engineers, by I. R. Miller, J. E. Freund & R. Johnson, Prentice Hall of India