

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Mechanical (Industrial Engineering)

Semester: II

Subject: Quality Engineering and Six Sigma Fundamentals (Major Elective II)
Code: 1724603

Sr. No.	Topic	Hours
1	Introduction: Different Definitions and Dimensions of Quality, Historical Perspective (<i>From Evolution of Quality Control, Assurance and Management to Quality as Business Winning Strategy</i>), Contribution of Renowned Quality Gurus (<i>Their Philosophies and Impact on Quality</i>).	05
2	Quality Engineering and Management Tools, Techniques & Standards: (A) Statistical Quality Control: Causes of Variation, Control Charts for Variables (<i>Mean and Range, Mean and Standard Deviation, Cumulative Sum Control Chart</i>), Control Chart Patterns and Corrective Actions, Control Charts for Attributes (<i>p-chart, np-chart, c-chart, u-chart</i>), Acceptance Sampling Plans (<i>Concepts of Producer's and Consumer's Risks, Types of Sampling Plans and their merits and demerits, Operating Characteristic Curve, Average Outgoing Quality Curve</i>), Errors in Making Inferences from Control Charts (<i>Type I and II errors</i>).	08
3	Quality Engineering and Management Tools, Techniques & Standards: (B) Quality Control & Improvement Tools: 7 QC tools, 7 New Quality Management Tools, 5S Technique, Kaizen, Poka-Yoke, Quality Circle, Cost of Quality Technique	06
4	Quality Engineering and Management Tools, Techniques & Standards: (C) Quality Assurance and Management: ISO:9000, ISO:14000, QS:9000 (<i>Concept, Scope, Implementation Requirements & Barriers, and Benefits</i>), Total Quality Management (<i>Basic Philosophy, Approach, Implementation Requirements & Barriers</i>), Introduction to National and International Quality Awards.	03
5	Designing for Quality: Introduction to Concurrent Engineering, Quality Function Deployment (QFD) and Failure Mode and Effect Analysis (FMEA) – Concept, Methodology and Application	06
6	Quality in Service Sectors: Characteristics of Service Sectors, Quality Dimensions in Service Sectors, Measuring Quality in Different Service Sectors.	03
7	Six Sigma Fundamentals: Basic Concept, Methodology, Process Improvement Model (DMAIC) Steps (<i>Objectives, Tools and Techniques Used</i>), Six Sigma Organization, Six Sigma Implementation Requirements, Introduction to Lean Six Sigma.	08
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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 Fundamentals of Quality Control and Improvement, Amitava Mitra, Prentice – Hall International Edition.
- 2 Juran's Quality Planning & Analysis for Enterprise Quality, Frank M. Gryna, Richard C. H. Chua, Joseph A. Defeo, Tata McGraw Hill Edition.
- 3 Total Quality Management by Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield and Mary Besterfield-Sacre, Pearson Education.
- 4 The Six Sigma Manual for Small and Medium Businesses, Craig W. Baird, Yes Dee Publishing Pvt. Ltd.

Reference Books:

- 1 Managing for Total Quality: N. Logothetis, Prentice Hall of India Pvt. Ltd.
- 2 Statistical Quality Control by Eugene L. Grant and Richard S. Leavenworth, Tata McGraw-Hill Publishing Company Ltd.
- 3 Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India
- 4 Quality Control Handbook, J. M. Juran & F. M. Gryna, Prentice Hall Publications.
- 5 Total Quality Management by K C Arora, S K Kataria & Sons.
- 6 Total Quality Management – Dr. S. Kumar, Laxmi Publication Pvt. Ltd.
- 7 All About Six Sigma, Warren Brussee, Tata McGraw Hill Edition.