TOTAL QUALITY ENGINEERING
(Professional Elective -IV)

II Semester

Course Code: 19ME2164

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Course Outcomes: At the end of the course, the student will be able to
CO1: Explain quality standards and need for standardization.
CO2: Outline quality measurement systems in various applications.
CO3: create and use control charts for SQC.
CO4: Use six sigma approach for various industrial applications.
CO5: Explain standards for total quality management in various service sectors.

UNIT-I **(10-Lectures)**

Introduction: Different Definitions and Dimensions of Quality, Historical Perspective stages of evolution - elements – definitions – continuous improvement, internal and external customers - customer satisfaction and customer delight.

Introduction to Quality Management Standards – need of standardization - Institutions ISO: 9000, ISO:14000, QS:9000 (Concept, Scope, Implementation Requirements & Barriers, and Benefits), Other contemporary standards.

Learning outcomes:

1. Describe the QM stages of evolution. (L1)
2. Explain customer satisfaction and customer delight. (L2)
3. Explain need of the standardization and the organization monitoring relevant to quality. (L2)

UNIT-II **(10-Lectures)**

Quality Engineering and Management Tools, Techniques -7 QC tools, 7 New Quality Management Tools, 5S Technique, Kaizen, Poka-Yoke, Quality Circle, Cost of Quality Technique. Quality models such as KANO, Westinghouse Quality measurement systems (QMS) – Developing and implementing QMS – non conformance database, inspection, nonconformity reports, QC, QA, quality costs, tools of quality.

Learning outcomes:

1. Describe the need of standardization and contemporary standards. (L1)
2. Explain QC Tools and Techniques. (L2)
3. Explain the process of developing and implementing QMS. (L2)

UNIT-III **(10-Lectures)**

Total Quality Management: Basic Philosophy, Approach, Implementation Requirements & Barriers

Designing for Quality: Introduction to Concurrent Engineering, Problem solving Methods, problem solving process – Steps in experimental design - Taguchi approach, Achieving robust design, reliability models, reliability studies, corrective action – order of precedence – system failure analysis approach – flow chart – fault tree analysis Quality Function Deployment (QFD) Quality function development (QFD), benchmarking) and Failure Model and Effect Analysis (FMEA) – pedigree analysis, cause and effect analysis, Concept, Methodology and Application FMEA.

Learning outcomes:

1. Describe the need of concurrent engineering. (L1)
2. Explain steps in system failure analysis approach. (L2)
3. Explain the quality function development. (L2)

UNIT-IV **(10-Lectures)**

Contemporary Trends in Quality Engineering & Management: Just in time (JIT) Concept, Lean Manufacturing, Agile Manufacturing, World Class Manufacturing, Total Productive Maintenance, Bench Marking, Business Process Re- engineering.

Quality circles – organization – focus team approach – statistical process control – process chart – Ishikawa diagram – preparing and using control charts, SQC, Continuous improvement – 5 S approach, Kaizen, reengineering concepts.

Learning outcomes:

1. Explain contemporary trends in quality engineering and management. (L2)
2. Describe quality circles and statistical process control with SQC and control charts. (L1)
3. Describe various Japanese concepts about manufacturing. (L1)

UNIT-V **(10-Lectures)**

Six Sigma - Basic Concept, Principle, Methodology, Implementation, Scope, Advantages and Limitation. Application of six sigma approach to various industrial situations.

Quality in Service Sectors: Characteristics of Service Sectors, Value improvement elements – value improvement assault – supplier teaming, vendor appraisal and analysis, Quality Dimensions in Service Sectors, Measuring Quality in different Service Sectors.

Learning outcomes:

1. Explain application of six sigma approach to various industrial situations. (L2)
2. Explain supplier teaming, vendor appraisal and analysis. (L2)
3. Explain quality dimensions and measuring in different service sectors. (L2)

TEXT BOOKS:

1. Bester Field, *Total Quality Management*, 3rd Edition, Pearson Education, New Delhi, 2011.
2. Vincent K. Omachonu and Joel E. Ross, *Principles of Total Quality*, 3rd Edition,Taylor & Francis, 2005.

REFERENCE BOOKS:

1. Logothetis W, *Management Total Quality*, Prentice Hall of India, New Delhi, 1999.
2. Feigenbaum A.V., *Total Quality Management*, McGraw-Hill, 1991.
3. Narayana V. and Sreenivasan N.S., *Quality Management – Concepts and Tasks*, New Age International, 1996.