

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Quality Management (Open Elective - II)
Course Code:	2ET1010781T
Pre-requisite Course:	Zeal to Learn the Subject

Course Objectives:

1. To understand the evolution of quality concepts and the role of quality gurus in modern quality management.
2. To apply quality engineering and management tools, techniques, standards, and awards for continuous improvement.
3. To explain the philosophy, principles, and organizational requirements of Total Quality Management for business excellence.
4. To use quality-oriented product and process design methodologies (QFD, FMEA, DOE, concurrent engineering) to improve reliability and customer satisfaction.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to Quality Concepts & Gurus: Different Definitions and Dimensions of Quality, Historical Perspective (From Evolution of Quality Control, Assurance and Management to Quality as Business Winning Strategy), Contribution of Renowned Quality Gurus (Their Philosophies and Impact on Quality).	04	10
2	Quality Tools, Techniques & Standards: 7 QC tools, 7 New Quality Management Tools, 5S Technique, Kaizen, Poka-Yoke, Quality Circle, Cost of Quality Technique, Introduction to Quality Management Standards – ISO : 9000, ISO:14000, QS:9000 (Concept, Scope, Implementation Requirements & Barriers, and Benefits), Introduction to National and International Quality Awards (Malcolm Baldrige National Quality Award – MBNQA, The Deming Prize Rajiv Gandhi National Quality Award).	08	20
3	Total Quality Management: Basic Philosophy, Approach, Implementation Requirements & Barriers.	04	10

4	Designing for Quality: Introduction to Concurrent Engineering, Quality Function Deployment (QFD) and Failure Mode and Effect Analysis (FMEA) – Concept, Methodology and Application (with case studies).	08	20
5	Introduction to Design of Experiments: Introduction, Methods, Taguchi approach, Achieving robust design, Steps in experimental design.	04	10
6	Contemporary Quality Practices: Just in time (JIT) Concept, Lean Manufacturing, Agile Manufacturing, World Class Manufacturing, Total Productive Maintenance (TPM), Bench Marking, Business Process Re-engineering (BPR), Six Sigma - Basic Concept, Principle, Methodology, Implementation, Scope, Advantages and Limitation of all as applicable.	08	20
7	Quality in Service Sectors: Characteristics of Service Sectors, Quality Dimensions in Service Sectors, Measuring Quality in Different Service Sectors.	04	10

Reference Books:

1. K C Jain and A K Chitale, Quality Assurance and Total Quality Management (ISO 9000, QS 9000 ISO 14000), Khanna Publishers, 2023.
2. B. L. Hanson & P. M. Ghare, Quality Control & Application, Prentice Hall of India, 1987.
3. Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield and Mary Besterfield-Sacre, Total Quality Management, Pearson Education, 2018.
4. Kanishka Bedi, Quality Management, Oxford University Press (India), 2017.
5. Dr. S. Kumar, Total Quality Management, Laxmi Publication Pvt. Ltd., 2006.
6. K C Arora, Total Quality Management, S K Kataria & Sons, 2010.
7. M. Mahajan, Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd., 2000.

E-Resources:

1. <http://www.nptel.ac.in>
2. <https://www.ocw.mit.edu/>

Course Learning Outcomes (CLO):

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain the definitions and dimensions of quality and analyze the historical evolution of quality from control to a business-winning strategy.	2 Understanding 4 Analyze
CLO2	Apply quality engineering and management tools and techniques for process improvement and explain the concepts, implementation, benefits, and challenges of quality management standards and national/international quality awards.	3 Applying
CLO3	Explain the basic philosophy and approach of Total Quality Management and analyze its implementation requirements, barriers, and role in achieving organizational excellence.	2 Understanding 4 Analyze
CLO4	Explain the concepts and methodologies of concurrent engineering, QFD, and FMEA, and apply them through case studies to design products and processes for improved quality and reliability.	3 Applying
CLO5	Explain the principles, methods, and steps of Design of Experiments, including the Taguchi approach, and apply them to achieve robust product and process design.	3 Applying
CLO6	Explain contemporary trends and methodologies in quality engineering and management—including JIT, Lean, Agile, TPM, Benchmarking, BPR, and Six Sigma—and analyze quality concepts, dimensions, and measurement techniques in service sectors.	2 Understanding 4 Analyze

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	H	M	L								M	L		
CLO2	M	H	M	M	L					M	L	M	H	M
CLO3	M	H	M	H	M					M	L	H	H	M
CLO4	M	H	H	M	M					M		H	H	H
CLO5	M	H	H	M	H		M			M		H	H	H
CLO6	M	H	H	H	M					M		H	H	H

H: High, M: Medium, L: Low