

PE209: QUALITY AND RELIABILITY ENGINEERING
CREDITS = 5 (L=3, T=0, P=2)

Course Objective:

Systemic understanding of manufacturing and service operations to be able to design and implement quality management systems

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				Total Marks
L	T	P		Theory		Practical		
			ESE	CE	ESE	CE		
3	2	0	5	70	30	30	20	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	<u>Introduction to Quality Management:</u> Concept of Quality and Quality Management Philosophies, Dimensions of Quality, Quality Control and Quality Assurance, Quality and Productivity, Cost of Quality, Responsibility for Quality, Strategic Quality Management, and Benchmarking, Quality Function Deployment.	06
2	<u>Philosophies of Total Quality System:</u> Evolution of Quality Control, Total Quality Management, Contribution of Quality Gurus: Deming, Juran, Crosby, Ishikawa.	04
3	<u>Statistical Process Control:</u> Meaning and significance of Statistical Process Control (SPC) Basics for Control Chart: Specification and control limits, Types of Control Charts, Analysis of Patterns in Control Chart, Control Charts for Variables and Attributes, Comparison between Control Charts for Variables and Attributes.	09

Unit No.	Topics	Teaching Hours
4	<u>Acceptance Sampling:</u> Need for Acceptance Sampling, Advantages and Disadvantages, Sampling by Attributes and Variables, Operating Characteristics (OC) Curve, Sampling related Terminology and their Interpretation, Types of Sampling Plans, Single and Double Sampling Plans, Standard Sampling System for Attributes, Sequential, Chain and Continuous Sampling, Acceptance Sampling by Variables.	09
5	<u>Quality Standards and Business Excellence Models:</u> Quality System Standards, Bureau of Indian Standard (BIS), Quality Council of India, International Organization for Standardization, ISO 9001, ISO14000, Types of Quality Audits, Malcolm Baldrige Award Criteria, Deming Award Criteria, Tata Business Excellence Model. Quality management in India, Quality related priorities of Indian companies, Case studies.	06
6	<u>Reliability Engineering:</u> Introduction, Need, Basic Elements of Reliability, Measurement of Reliability Cost of Reliability, Maintenance & Reliability, Maintainability, MTBF, MTTR, Maintenance action Rate, Failure Mode Effect & Criticality Analysis (FMECA), Hazard Analysis, System Reliability- Series, Parallel and Mix Problem.	08
TOTAL		42

List of References:

1. KanishkaBedi, “*Quality Management*”, Oxford University Press, New Delhi
2. AmitavaMitra, “*Fundamentals of Quality Control and Improvement*”, Wiley India Pvt. Ltd., New Delhi
3. Dale H Besterfield, “*Total Quality Management*”, Person Education.
4. P N Mukharjee, “*Total Quality Management*”, Prentice Hall India.
5. M Mahajan, “*Statistical Quality Control*”, DhanpaiRai& Sons, New Delhi.
6. D D Sharma, “*Total Quality Management*”, Sultan Chand & Sons.
7. Connol, “*Practical Reliability Engineering*”, Wiley.
8. L S Srinath, “*Reliability Engineering*”, Affiliated East West Press Pvt. Ltd.

Course Outcomes (COs):

At the end of this course students will be able to

1. Apply necessary steps for quality function deployment and carry out strategic quality management.
2. Build and sustain total quality organization through quality tools and philosophies.
3. Apply statistical quality control techniques to identify the root cause of quality problems and maintain control over processes.
4. Ability to critically think for efficient decision making and implementing the quality standards.
5. Apply reliability engineering principles for maintainability and to ensure availability and optimal utilization of resources.