



**A T M E**  
College of Engineering



# Quality Assurance & Quality Control (BCV657D)

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## MODULE 1 – OVERVIEW OF QUALITY

- Meaning and definition of quality
- Dimensions of quality
- Evolution of quality management
- Quality inspection
- Quality Control (QC)
- Quality Assurance (QA)
- Quality Engineering (QE)
- Quality Management (QM)

## Meaning of Quality

- Quality refers to the degree to which a **product, service, or process meets customer expectations**
- It ensures **conformance to specified requirements**
- Key attributes:
  - Reliability
  - Durability
  - Efficiency
  - Customer satisfaction

## Definitions of Quality

- **Fitness for Use** – Joseph M. Juran
- **Conformance to Requirements** – Philip B. Crosby
- **Customer Satisfaction** – Meeting or exceeding customer expectations

## Dimensions of Quality

- **Manufacturing Quality**
- Performance
- Reliability
- Durability
- Conformance
- Serviceability

## Service Quality

- Responsiveness
- Assurance
- Empathy
- Reliability
- Tangibles



## Software Quality

- Functionality
- Usability
- Efficiency
- Maintainability
- Security

## History of Quality Management

- **Pre-1900:** Inspection-based quality
- **1920–1930:** Statistical Process Control (Walter Shewhart)
- **1950–1980:** Total Quality Management (Deming, Juran, Crosby)
- **1990–Present:** ISO 9001, Six Sigma, Lean, Agile approaches



## Quality Management Approaches

- ISO 9001 – Quality Management System
- Six Sigma – DMAIC methodology
- Lean – Waste elimination
- Total Quality Management (TQM)
- Kaizen – Continuous improvement
- Agile & DevOps – Software quality focus

## Importance of Quality

- Improves customer satisfaction and loyalty
- Reduces defects and rework cost
- Enhances brand reputation
- Increases productivity and efficiency
- Ensures regulatory and standard compliance

## Quality Inspection – Overview

- Ensures products/services meet defined standards
- Identifies defects before delivery
- Ensures compliance with specifications

## Types of Quality Inspection

- Pre-Production Inspection (PPI)
- In-Process Inspection (IPI / DPI)
- Pre-Shipment Inspection (PSI)
- Incoming Quality Control (IQC)
- Final Random Inspection (FRI)

## Methods of Quality Inspection

- Visual inspection
- Dimensional inspection
- Functional testing
- Environmental testing
- Destructive testing
- Non-Destructive Testing (NDT)

## Quality Control (QC)

- Ensures products meet quality standards
- Focuses on **detecting and correcting defects**
- Reactive in nature

## Key Components of Quality Control

- Inspection and testing
- Statistical Quality Control (SPC, Acceptance Sampling)
- Standard Operating Procedures (SOPs)
- Corrective and Preventive Actions (CAPA)

## Quality Control Tools

- Control charts
- Pareto analysis
- Cause-and-Effect (Ishikawa) diagram
- Checklists



## Quality Assurance (QA)

- Prevents defects before occurrence
- Proactive and process-oriented
- Ensures consistency and compliance

## Principles of Quality Assurance

- Prevention over inspection
- Process-oriented approach
- Continuous improvement
- Compliance with ISO and industry standards

## QA vs QC

### Quality Assurance

Prevents defects

Proactive

Process-focused

Training & audits

### Quality Control

Detects defects

Reactive

Product-focused

Inspection & testing

## Quality Engineering (QE)

- Integrates engineering and quality principles
- Ensures reliability and performance
- Applies preventive and predictive methods

## Quality Engineering – Key Areas

- Product & process design
- Statistical quality control
- Automation and digital quality systems
- Risk management and compliance
- Continuous improvement

## Quality Management (QM)

- Systematic approach to ensure quality
- Focus on planning, assurance, control, and improvement
- Enhances customer satisfaction and efficiency

## Components of Quality Management

- Quality Planning (QP)
- Quality Assurance (QA)
- Quality Control (QC)
- Continuous Improvement (CI)