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BBA	SEMESTER 6	CALICUT UNIVERSITY	COURSE CODE: BBA6CJ305

TOTAL QUALITY MANAGEMENT

EXAM REVISION NOTES

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MODULE I

FOUNDATIONS OF TOTAL QUALITY MANAGEMENT & CORE PHILOSOPHIES

Concept, Meaning, and Evolution of Quality: The definition of quality has evolved through four major historical epochs:

- **Inspection Era (1900s–1930s):** Retrospective sorting of completed finished goods; discarding or reworking defective items at the end of the factory line.
- **Statistical Quality Control - SQC (1930s–1950s):** Walter Shewhart introduced statistical sampling and control charts to monitor process variation during manufacturing.
- **Quality Assurance - QA (1950s–1980s):** Systemic focus on engineering design, reliability testing, and standard operating procedures to prevent defects before production begins.
- **Total Quality Management - TQM (1980s–Present):** Holistic, organization-wide commitment involving every employee from the CEO to the shop-floor line worker, centered on customer delight, process optimization, and continuous learning.

Dimensions of Quality: Product vs. Service: Quality manifests differently in physical manufacturing versus intangible service delivery:

- **Performance:** , automobile acceleration, fuel efficiency).
- **Features:** , heated leather seats, lane-assist cameras).
- **Reliability:** Probability that a product will not malfunction or fail within a specified time period (Mean Time Between Failures - MTBF).
- **Conformance:** The degree to which a product's design and operating characteristics meet established engineering standards and tolerances.
- **Durability:** Amount of use one gets from a product before it deteriorates completely (product economic life).

Foundational Philosophies of Quality Gurus: Deming emphasized that 85% to 94% of quality failures stem from the system, not the workers. He formulated the famous 14 Points for Management, encompassing: create constancy of purpose; cease dependence on mass inspection; drive out fear; break down barriers between departments; eliminate numerical quotas; and institute vigorous training and leadership.

- **Quality Planning:** Identifying customers, determining their needs, developing products responding to those needs, and establishing processes capable of producing the product.
- **Quality Control:** Operating the process under real conditions, evaluating actual performance, and taking corrective action on the sporadic spike in defects.
- **Quality Improvement:** Breakthrough chronic defect elimination by institutionalizing quality councils and dedicated project teams.
- Quality is defined as conformance to requirements, not as goodness or luxury.
- The system of quality is prevention, not appraisal.

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MODULE II

STRATEGIC LEADERSHIP, EMPLOYEE EMPOWERMENT & CONTINUOUS IMPROVEMENT

Strategic Quality Planning and Policy Deployment (Hoshin Kanri): In a TQM environment, quality objectives are directly integrated into corporate strategic plans:

- **Quality Statements:** Formulating an unambiguous Quality Vision (inspirational future state), Quality Mission (operational commitment), and Quality Policy (governing principles for daily execution).
- **Quality Councils:** Executive steering committees headed by the CEO and operational division heads established to establish quality goals, allocate funding, and review improvement projects.
- **Hoshin Kanri (Policy Deployment):** A strategic methodology that cascades corporate high-level strategic objectives down through departmental operational targets via a collaborative "catch-ball" negotiation process, ensuring complete vertical and horizontal alignment across the enterprise.

Employee Involvement, Empowerment, and Quality Culture: TQM rejects the Taylorist dichotomy separating planners from workers. Line workers possess the deepest intimate knowledge of shop-floor bottlenecks and customer friction points.

- **Quality Circles (QC):** Small autonomous groups of shop-floor employees (typically 6 to 10 workers from the same work area) who volunteer to meet regularly to identify, analyze, and solve work-related quality problems utilizing statistical QC tools.
- **Psychological Empowerment:** Granting frontline employees the authority and budget to stop a production line (the Toyota Andon Cord) or immediately resolve customer complaints without seeking multi-tiered managerial approvals.
- **Recognition and Rewards:** Redesigning performance appraisal systems to reward team collaboration, process optimizations, and error reporting, rather than individual output volume.

Continuous Process Improvement: The Kaizen Philosophy & 5S: Kaizen is a Japanese philosophy signifying "Change for the Better" or continuous, endless incremental improvement involving everyone in the organization.

- **Seiri:** ; Frees floor space; eliminates obsolete tools and materials.
- **Seiton:** ; Eliminates wasted search time; accelerates tooling retrieval.
- **Seiso:** ; Prevents machinery breakdown; creates a pristine environment.
- **Seiketsu:** ; Maintains consistency; embeds daily housekeeping routines.

Supplier Partnerships and Quality Rating Systems: In modern manufacturing, bought-out components and outsourced materials account for 50% to 80% of total product cost.

- **Single-Sourcing:** Consolidating procurement volume with a single certified vendor to achieve scale economies and co-engineering alignment.
- **Supplier Quality Rating Systems:** Evaluating vendors across composite scorecards weighting Quality (defect rates), Delivery (on-time delivery percentage), Price competitiveness, and Service responsiveness.

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MODULE III

QUALITY ENGINEERING TOOLS, SIX SIGMA & ROBUST DESIGN

Ishikawa's Seven Traditional Quality Control (QC) Tools

- **Pareto Chart:** Based on Vilfredo Pareto's 80/20 rule: 80% of process problems stem from 20% of vital causes.
- **Cause-and-Effect (Fishbone / Ishikawa) Diagram:** A graphical brainstorming tool mapping root causes of a quality defect across the 6Ms: Manpower, Methods, Machines, Materials, Measurement, and Mother Nature (Environment).
- **Histogram:** Graphical frequency distribution displaying the central tendency, dispersion, and shape of continuous process measurement data.
- **Check Sheet:** Structured, standardized form for recording and tallying observational defect data at the source in real time.
- **Scatter Diagram:** Cartesian plot displaying bivariate data pairs to visually detect correlation between a suspected process variable and an outcome defect.

The Six Sigma Methodology (DMAIC): 99966% defect-free yield).

- **Define:** Define the project charter, business problem, project scope, and identify the customer's Critical to Quality (CTQ) requirements.
- **Measure:** Map the current process, establish baseline performance metrics, and validate the measurement system (Gage R&R).
- **Analyze:** Analyze process data and root causes utilizing statistical hypothesis testing, regression modeling, and value-stream mapping.
- **Improve:** Develop, simulate, and implement pilot solutions that eliminate confirmed root causes using Design of Experiments (DOE).
- **Control:** Institutionalize optimizations by updating standard operating procedures, implementing statistical process control (SPC) charts, and mistake-proofing (Poka-Yoke).

Process Capability Metrics: Cp and Cpk: Process capability evaluates whether an in-control manufacturing process is capable of producing output within customer engineering specification limits (USL and LSL):

Robust Design: Genichi Taguchi's Quality Loss Function: Traditional engineering assumed that any product falling inside specification limits is acceptable (the "goal-post" mentality).

Failure Mode and Effects Analysis (FMEA) and Cost of Quality (COQ): FMEA is a proactive risk assessment technique evaluating potential component failure modes across three 1-to-10 severity ratings to compute the Risk Priority Number (RPN):

- **Prevention Costs:** Investments to prevent defects (employee training, supplier certification, design reviews).
- **Appraisal Costs:** Expenses to inspect and test products (laboratory testing, calibration, audits).
- **Internal Failure Costs:** Costs incurred before product shipment (scrap, rework, re-inspection).
- **External Failure Costs:** Costs incurred after delivery to the customer (warranty claims, recalls, legal liabilities, lost reputation).

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MODULE IV

QUALITY MANAGEMENT SYSTEMS, ISO STANDARDS & ENVIRONMENTAL AUDITING

The ISO 9000 Series Architecture: The ISO 9000 family encompasses the most widely recognized international management standards in history:

- **ISO 9000:2015:** Quality Management Systems – Fundamentals and Vocabulary.
- **ISO 9001:2015:** Quality Management Systems – Requirements.
- **ISO 9004:2018:** Quality Management – Quality of an Organization – Guidance to Achieve Sustained Success.

Seven Core Quality Management Principles of ISO 9001:2015

- **Customer Focus:** Understanding current and future customer needs, meeting customer requirements, and striving to exceed customer expectations.
- **Leadership:** Establishing unity of purpose and creating conditions in which employees are fully engaged in achieving corporate quality objectives.
- **Engagement of People:** Empowering competent, respected personnel at all levels across the enterprise.
- **Process Approach:** Managing activities and interrelated resources as coherent processes that function as a unified system.
- **Improvement:** An ongoing organizational focus on continuous improvement.

Structure of ISO 9001:2015: The High-Level Structure (Annex SL): ISO 9001:2015 conforms to the 10-clause Annex SL structure, facilitating integration with environmental (ISO 14001) and occupational health and safety (ISO 45001) standards:

- **Clauses 1–3:** Scope, Normative References, Terms and Definitions.
- **Clause 4:** Context of the Organization: Understanding internal/external issues and stakeholder expectations.
- **Clause 5:** Leadership: Top management commitment, quality policy, and organizational roles.
- **Clause 6:** Planning: Actions to address risks and opportunities (Risk-Based Thinking) and quality objectives.
- **Clause 7:** Support: Resources, competence, awareness, communication, and documented information.

Sector-Specific Standards and Environmental Management (ISO 14001)

- **IATF 16949:** Automotive Supply Chains; Stringent defect prevention, supply chain reduction of variation and waste, APQP, PPAP.
- **AS 9100:** Aerospace, Aviation & Defense; Critical safety parts tracking, counterfeit parts prevention, configuration management.
- **TL 9000:** Telecommunications; Hardware reliability, software development metrics, network outage tracking.
- **ISO 22000:** Food Safety Management (FSMS); HACCP principles, interactive communication across supply chain, prerequisite programs.

QMS Implementation, Internal Audits, and Registration: , TUV, BSI, SGS). Surveillance audits are conducted annually, with full recertification required every three years.

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