ICTQual AB

Qualification Specification

ICTQual AB Quality Control in Mechanical

Website
www.ictqualab.co.uk

Email:
support@ictqualab.co.uk

ICTQual AB's

Quality Control in Mechanical

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Qualification Specification about

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About ICTQual AB's

ICTQual AB's is a distinguished awarding body based in the United Kingdom, dedicated to fostering excellence in education, training, and skills development. Committed to global standards, ICTQual AB's provides internationally recognized qualifications that empower individuals and organizations to thrive in an increasingly competitive world. Their offerings span diverse industries, including technical fields, health and safety, management, and more, ensuring relevance and adaptability to modern workforce needs.

ICTQual AB's delivers high-quality educational solutions through a network of Approved Training Centres worldwide. Their robust standards and innovative teaching methodologies equip learners with practical knowledge and skills for personal and professional growth. With a mission to inspire lifelong learning and drive positive change, ICTQual AB's continuously evolves its programs to stay ahead of industry trends and technological advancements.

Course Overview

This qualification in Quality Control in Mechanical is designed to establish rigorous standards and objectives for ensuring consistent quality across mechanical engineering and manufacturing environments. The course provides a structured framework to develop essential skills and in-depth knowledge required to implement, monitor, and improve quality assurance mechanisms within mechanical systems and production lines. The programme covers critical areas such as mechanical inspection techniques, calibration and measurement systems, defect identification and prevention strategies, non-destructive testing (NDT), and root cause analysis. Learners will explore international quality standards, industry best practices, and technical documentation processes to support precision, consistency, and regulatory compliance in mechanical operations. Through detailed study and hands-on practical assessments, individuals will gain the ability to interpret mechanical drawings and specifications, use measurement tools effectively, implement statistical process control (SPC), and understand failure modes in mechanical systems. This qualification emphasises the importance of accuracy, traceability, and continual improvement in quality processes, aligning mechanical quality control practices with safety, reliability, and performance standards.

Course Aim

The aim of this qualification is to prepare learners with the theoretical understanding and practical competencies required to manage and uphold mechanical quality standards in engineering and manufacturing settings. The course focuses on empowering learners to identify quality issues, apply inspection techniques, analyse root causes, and contribute to the development of quality improvement systems in mechanical operations.

For Whom This Course is For:

This course is ideally suited for:

- Quality inspectors, technicians, and supervisors working within mechanical or industrial settings.
- Maintenance and mechanical engineers seeking to enhance their quality assurance capabilities.
- Individuals involved in manufacturing, machining, or assembly processes who are responsible for quality compliance.
- Learners aspiring to enter the field of quality control with a mechanical engineering focus.
- Professionals aiming to align their skills with international mechanical quality standards and inspection requirements.

Whether entering the field or looking to formalise existing skills, this qualification supports career development by enabling effective quality control practices that meet both organisational goals and industry benchmarks.

Certification Framework

Qualification title	**ICTQual AB Quality Control in Mechanical**
Course ID	QC0003
Grading Type	Pass / Fail
Competency Evaluation	Coursework / Assignments / Verifiable Experience
Assessment	The assessment and verification process for ICTQual AB's qualifications involves two key stages: **Internal Assessment and Verification:** ✓ Conducted by the staff at the Approved Training Centre (ATC) to ensure learners meet the required standards through continuous assessments. ✓ Internal Quality Assurance (IQA) is carried out by the centre's IQA staff to validate the assessment process. **External Quality Assurance:** ✓ Managed by ICTQual AB's verifiers, who periodically review the centre's assessment and IQA processes. Verifies that assessments are conducted to the required standards and ensures consistency across centres

Entry Requirements

Entry requirements for ICTQual Quality Control in Mechanical may vary depending on the institution offering the program. However, typical entry requirements for such a course may include:

- ✓ Prospective students are typically required to have a minimum educational qualification equivalent to a high school diploma or its international equivalent. Some institutions may require specific coursework in mathematics, physics, or engineering as part of the high school curriculum.
- ✓ While not always mandatory, a background in mechanical engineering or related fields such as manufacturing engineering, industrial engineering, or materials science can be advantageous. Familiarity with engineering principles, materials, and manufacturing processes provides a solid foundation for understanding quality control concepts and methodologies.
- ✓ Strong mathematical and scientific skills are essential for success in quality control in mechanical engineering. Candidates should have a solid understanding of algebra, geometry, calculus, and physics, as these subjects form the basis of many quality control techniques and calculations.
- ✓ Proficiency in the language of instruction, usually English, is often required, as course materials, lectures, and assessments are typically conducted in English. Candidates may be required to provide proof of language proficiency through standardized tests such as the TOEFL or IELTS, especially if English is not their native language.
- ✓ Candidates should possess strong analytical and problem-solving skills to effectively identify, analyze, and address quality-related issues in mechanical engineering processes and products. The ability to think critically, troubleshoot problems, and propose solutions is highly valued in the field of quality control.

Qualification Structure

This qualification comprises 11 mandatory units. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units	
Unit Ref#	**Unit Title**
QC0003-01	Fundamentals of Quality Control
QC0003-02	Statistical Methods for Quality Control
QC0003-03	Metrology and Measurement Systems
QC0003-04	Quality Inspection and Testing
QC0003-05	Quality Management Systems (QMS)
QC0003-06	Reliability Engineering
QC0003-07	Design of Experiments (DOE)
QC0003-08	Root Cause Analysis and Corrective Action
QC0003-09	Advanced Quality Control Techniques
QC0003-10	Quality Control in Supply Chain Management
QC0003-11	Quality Control in Product Development

Centre Requirements

To ensure quality training delivery, centres must adhere to the following standards:

1. Centre Approval

- ✓ Centres must be formally approved by ICTQual AB's before delivering this qualification.
- ✓ Approval involves a review of facilities, policies, and staff qualifications.

2. Qualified Staff

- ✓ **Tutors:** Must hold qualifications at least one level higher than the qualification being delivered, in mechanical engineering, quality control, or a related field.
- ✓ **Assessors:** Must hold a recognized assessor qualification (e.g., CAVA, AVRA) or equivalent)
- ✓ **Internal Quality Assurers (IQAs):** Must hold a recognized IQA qualification (e.g. Level 4 Award in the IQA and Level 4 Certificate in Leading the IQA) and experience to oversee assessment standards.

3. Learning Facilities

Centre must offer:

- ✓ Private study areas and internet-enabled workspaces (for blended or physical delivery)
- ✓ Academic and pastoral support for learners
- ✓ Administrative support must be available to manage enrolment, tracking, and learner queries efficiently

4. Health and Safety Compliance

- ✓ All training facilities must comply with health and safety regulations.
- ✓ Centres must conduct regular risk assessments for practical activities.

5. Learning Resources

- ✓ **Course Materials:** Approved textbooks, study guides, and digital content must align with the qualification standards.
- ✓ **Assessment Tools:** Templates and guidelines must be provided to ensure standardized evaluation processes.
- ✓ **E-Learning Support:** Centres offering online or blended learning must implement an effective Learning Management System (LMS).

6. Assessment and Quality Assurance

- ✓ Centres must ensure assessments meet ICTQual AB's competency standards.
- ✓ Internal quality assurance (IQA) must be conducted to maintain consistency.
- ✓ External verifiers from ICTQual AB's will review assessment and training practices.

7. Learning Support

- ✓ **Qualification Guidance:** Support for coursework and assignments.
- ✓ **Career Pathway Assistance:** Information on progression opportunities in sustainability and energy sectors.
- ✓ **Accessibility Support:** Accommodations for learners with disabilities or language barriers.

8. Policies and Compliance

Centres must uphold the following policies in accordance with ICTQual AB's standards:

- ✓ Equality, Diversity, and Inclusion Policy.
- ✓ Health and Safety Policy.
- ✓ Safeguarding and Learner Protection Policy.
- ✓ Complaints and Appeals Procedure.
- ✓ Data Protection and Confidentiality Policy.

9. Reporting Requirements

- Centres must provide ICTQual AB's with regular reports on learner registrations, progress, and certification outcomes.
- Assessment records must be maintained for external auditing and quality assurance purposes.

Support for Candidates

Centres should ensure that materials developed to support candidates:

- ✓ Facilitate tracking of achievements as candidate's progress through the learning outcomes and assessment criteria.
- ✓ Include information on how and where ICTQual AB's policies and procedures can be accessed.
- ✓ Provide mechanisms for Internal and External Quality Assurance staff to verify and authenticate evidence effectively.

This approach ensures transparency, supports candidates' learning journeys, and upholds quality assurance standards.

Assessment

This qualification is competence-based, requiring candidates to demonstrate proficiency as defined in the qualification units. The assessment evaluates the candidate's skills, knowledge, and understanding against the set standards. Key details include:

1. **Assessment Process:**

   - ✓ Must be conducted by an experienced and qualified assessor.
   - ✓ Candidates compile a portfolio of evidence that satisfies all learning outcomes and assessment criteria for each unit.

2. **Types of Evidence:**

   - ✓ Observation reports by the assessor.
   - ✓ Assignments, projects, or reports.
   - ✓ Professional discussions.
   - ✓ Witness testimonies.
   - ✓ Candidate-produced work.
   - ✓ Worksheets.
   - ✓ Records of oral and written questioning.
   - ✓ Recognition of Prior Learning (RPL).

3. **Learning Outcomes and Assessment Criteria:**

   - ✓ **Learning Outcomes:** Define what candidates should know, understand, or accomplish upon completing the unit.
   - ✓ **Assessment Criteria:** Detail the standards candidates must meet to demonstrate that the learning outcomes have been achieved.

This framework ensures rigorous and consistent evaluation of candidates' competence in line with the qualification's objectives.

Unit Descriptors

QC0003-01-Fundamentals of Quality Control

This unit introduces the basic ideas behind quality control in mechanical industries. Learners will understand what quality means, why it is important, and how it is maintained in manufacturing. Topics include the difference between quality control and quality assurance, the role of standards, inspection processes, and continuous improvement. Learners will also explore how to identify defects and how quality affects customer satisfaction and safety.

Learning Outcome:	Assessment Criteria:
1. Understand the basic principles, concepts, and objectives of quality control in mechanical engineering.	1.1 Explain the core principles of quality control, including its purpose, benefits, and challenges within a manufacturing context. 1.2 Describe the key concepts of quality, quality assurance, and quality control, differentiating between them with clear examples. 1.3 Identify and define the primary objectives of a quality control system, such as defect prevention, cost reduction, and process improvement. 1.4 Illustrate the historical evolution of quality control from simple inspection to modern quality management.
2. Identify the importance of quality control in ensuring product reliability, performance, and customer satisfaction.	2.1 Explain how effective quality control directly impacts the reliability of a mechanical product over its lifecycle. 2.2 Describe the relationship between quality control measures and a product's performance specifications. 2.3 Analyse how maintaining consistent product quality contributes to customer satisfaction and brand loyalty. 2.4 Discuss the potential consequences of poor quality control on a business, including financial losses, reputational damage, and legal issues. 2.5 Provide examples of how quality control prevents catastrophic failures in critical mechanical systems.
3. Demonstrate knowledge of key quality control terminology, standards, and methodologies.	3.1 Define at least ten key terms commonly used in quality control, such as tolerance, defect, non-conformance, and sampling. 3.2 Name and describe at least two internationally recognized quality standards or frameworks relevant to mechanical engineering. 3.3 Explain the purpose of key quality control methodologies, such as Statistical Process Control (SPC) and Six Sigma.

3.4 Correctly use quality control terminology in a written report or a discussion about a quality issue.

QC0003-02-Statistical Methods for Quality Control

In this unit, learners will study the use of statistics in controlling and improving quality. They will learn about data collection, data types, and how to present information clearly using charts and graphs. The unit also explains how to calculate and use averages, ranges, and control limits to check if a process is working properly. Statistical Process Control (SPC) and sampling methods will also be introduced.

Learning Outcome:	Assessment Criteria:
1. Apply statistical techniques such as descriptive statistics, probability distributions, and hypothesis testing to analyze process data.	1.1 Calculate and interpret measures of central tendency (mean, median, mode) and dispersion (range, standard deviation) for a given dataset of dimensional measurements. 1.2 Explain the practical application of at least two common probability distributions (e.g., normal distribution, binomial distribution) in predicting product quality outcomes. 1.3 Formulate a null and alternative hypothesis for a given process improvement scenario. 1.4 Perform a basic hypothesis test on a set of process data and correctly state the conclusion.
2. Utilize statistical process control (SPC) tools including control charts, histograms, and scatter diagrams to monitor and control process variability. .	2.1 Construct an X-bar and R-chart using provided process data and accurately plot the control limits. 2.2 Create a histogram from a dataset of product weights and interpret its shape and distribution. 2.3 Generate a scatter diagram to explore the relationship between two process variables (e.g., temperature and part thickness). 2.4 Identify and explain out-of-control conditions on a control chart using established rules (e.g., a point outside the control limits or a run of seven points). 2.5 Describe how the visual information from a scatter diagram can inform process adjustments.
3. Interpret statistical data to make informed decisions and improvements in quality control processes.	3.1 Analyse an in-control but not capable process and recommend appropriate actions to reduce variability. 3.2 Evaluate the significance of a trend or pattern observed on a control chart and suggest a potential root cause. 3.3 Use statistical data to justify a decision to accept or reject a batch of products. 3.4 Present a summary of statistical findings to a stakeholder, explaining the data and proposed actions in a clear, non-technical manner.

QC0003-03- Metrology and Measurement Systems

This unit focuses on how measurements are made and controlled in mechanical quality control. Learners will understand the importance of accurate measurements and the tools used, such as callipers, micrometres, gauges, and coordinate measuring machines (CMMs). The unit also covers calibration, measurement uncertainty, and the principles of traceability in measurement systems.

Learning Outcome:	Assessment Criteria:
1. Understand the principles of metrology and measurement systems used in quality control.	1.1 Define metrology and explain its significance in ensuring product quality and interchangeability. 1.2 Identify and describe the function of at least three different types of measurement instruments used in mechanical quality control (e.g., calipers, micrometers, CMM). 1.3 Explain the concepts of accuracy, precision, repeatability, and reproducibility, and differentiate between them with examples. 1.4 Describe the purpose of a traceability chain for a measurement instrument.
2. Demonstrate proficiency in calibrating measurement instruments and assessing measurement uncertainty.	2.1 Follow a standard operating procedure to perform a basic calibration check on a micrometer. 2.2 Document the results of a calibration check, including any adjustments made and the final status of the instrument. 2.3 Explain the sources of measurement uncertainty in a given measurement process. 2.4 Calculate a basic measurement uncertainty budget for a single measurement. 2.5 Select the appropriate calibration frequency for a measurement instrument based on its usage and criticality.
3. Apply metrological principles to ensure accurate and reliable measurement in quality control activities.	3.1 Select the most appropriate measurement instrument for a given dimensional tolerance requirement. 3.2 Explain how environmental factors (e.g., temperature, vibration) can affect measurement accuracy and how to mitigate their impact. 3.3 Develop a clear and concise measurement procedure for a critical component feature.

3.4 Demonstrate correct handling and care of measurement instruments to maintain their accuracy and longevity.

QC0003-04- Quality Inspection and Testing

Learners will explore different inspection and testing methods used in mechanical manufacturing. The unit covers visual inspection, dimensional checks, material tests, and functional tests. It also explains how to record inspection results and report defects. Non-destructive testing (NDT) methods such as ultrasonic, magnetic particle, and dye penetrant testing will also be introduced.

Learning Outcome:	Assessment Criteria:
1. Identify different inspection and testing techniques used to evaluate product quality, including visual inspection, dimensional inspection, and non-destructive testing (NDT).	1.1 Categorize and describe the primary purpose of at least two different non-destructive testing (NDT) methods. 1.2 Identify the key characteristics to check during a visual inspection of a welded component. 1.3 Differentiate between dimensional inspection, functional testing, and destructive testing. 1.4 List the standard tools and equipment required to perform a dimensional inspection of a machined part. 1.5 Learning Outcome: Perform quality inspections and tests according to established procedures and standards.
2. Perform quality inspections and tests according to established procedures and standards.	2.1 Perform a dimensional inspection of a part using a digital caliper and a micrometer, correctly recording all measurements. 2.2 Follow a specified procedure to conduct a leak test on a sealed assembly and accurately document the outcome. 2.3 Demonstrate the proper use of a go/no-go gauge to check a part's compliance with a tolerance specification. 2.4 Complete an inspection report or checklist with all necessary information, including part numbers, dates, and inspector signatures. 2.5 Identify a non-conforming part during an inspection and correctly tag or quarantine it according to procedure.
3. Interpret inspection and test results to determine product conformance and identify areas for improvement.	3.1 Analyse dimensional inspection data against a technical drawing's specifications to determine if the part conforms. 3.2 Interpret the results of an NDT test to identify and classify a potential defect. 3.3 Evaluate a set of test results to determine if a product batch meets its functional performance requirements.

3.4 Formulate a summary of inspection findings for a specific product, highlighting any recurring issues or non-conformances.

QC0003-05-Quality Management Systems (QMS)

This unit explains the structure and purpose of a Quality Management System (QMS). Learners will study the main parts of QMS standards, such as ISO 9001, and how they are applied in mechanical industries. Topics include quality policies, documentation, audits, process control, and management reviews. Learners will also understand the benefits of using a QMS in improving quality and meeting customer needs.

Learning Outcome:	Assessment Criteria:
1. Understand the requirements and principles of quality management systems (QMS), including ISO 9001 standards.	1.1 Describe the seven quality management principles outlined in ISO 9001:2015. 1.2 Explain the purpose and key components of a QMS manual and its role in an organization. 1.3 Identify the main sections of the ISO 9001 standard and explain the purpose of each. 1.4 Discuss the benefits of implementing an ISO 9001-certified QMS for a manufacturing company.
2. Implement and maintain QMS processes within an organization to ensure compliance with quality standards and customer requirements.	2.1 Draft a document control procedure that aligns with QMS requirements. 2.2 Identify the steps required to establish a process for handling non-conforming products. 2.3 Explain the process for training new employees on QMS procedures. 2.4 Create a simple process flow diagram for a manufacturing task that incorporates quality checks. 2.5 Describe the roles and responsibilities of key personnel in maintaining the QMS.
3. Conduct internal audits and continual improvement activities to enhance the effectiveness of the QMS.	3.1 Create an internal audit checklist for a specific department (e.g., Receiving Inspection). 3.2 Conduct a mock internal audit of a process and document the findings, including both conformances and non-conformances. 3.3 Explain the Plan-Do-Check-Act (PDCA) cycle and its application in continual improvement. 3.4 Propose a specific continual improvement initiative based on internal audit findings or process performance data.

QC0003-06-Reliability Engineering

This unit teaches how to make sure that products and systems work reliably over time. Learners will understand how to measure failure rates, calculate reliability, and improve the life of mechanical parts. Topics include Failure Modes and Effects Analysis (FMEA), maintenance strategies, and designing for reliability. The goal is to reduce breakdowns and improve product performance.

Learning Outcome:	Assessment Criteria:
1. **Apply reliability engineering principles to assess and improve the reliability and durability of mechanical systems and components.**	1.1 Define reliability, maintainability, and availability and explain their interrelationship. 1.2 Explain the "bathtub curve" and its significance in understanding failure rates over a product's life. 1.3 Use reliability engineering principles to recommend design changes that would improve a component's durability. 1.4 Calculate the mean time between failures (MTBF) and mean time to failure (MTTF) for a simple system based on historical data.
2. **Perform reliability analysis techniques such as failure mode and effects analysis (FMEA) and reliability block diagrams (RBD).**	2.1 Complete a FMEA for a simple mechanical assembly, correctly identifying potential failure modes, causes, effects, and severity/occurrence/detection ratings. 2.2 Construct a reliability block diagram for a system with both series and parallel components. 2.3 Calculate the system reliability for a given RBD, explaining the calculations for both series and parallel blocks. 2.4 Interpret the results of an FMEA to prioritize critical failure modes for mitigation. 2.5 Explain the difference between a functional FMEA and a design FMEA.
3. **Develop reliability improvement strategies to enhance product performance and reduce failure risks.**	3.1 Propose at least two different design strategies (e.g., redundancy, derating) to improve the reliability of a system. 3.2 Develop a plan for accelerated life testing to validate a product's expected lifespan. 3.3 Outline a preventive maintenance schedule for a piece of equipment to reduce its failure rate. 3.4 Formulate a justification for a proposed reliability improvement based on cost-benefit analysis.

QC0003-07-Design of Experiments (DOE)

In this unit, learners will study how to plan and run experiments to improve quality. Design of Experiments (DOE) helps engineers test different factors and see how they affect results. Learners will learn how to set up experiments, collect and analyse data, and make decisions based on results. This helps in improving processes, reducing defects, and increasing efficiency.

Learning Outcome:	Assessment Criteria:
1. Plan and conduct designed experiments to optimize process parameters and improve product quality.	1.1 Identify the key steps in planning a designed experiment (e.g., defining objectives, selecting factors, choosing a design). 1.2 Develop a simple full factorial experimental design for a process with two factors at two levels. 1.3 Identify and explain the purpose of a control factor and a noise factor in an experiment. 1.4 Explain the concept of randomization and its importance in DOE.
2. Analyze experimental data using statistical methods to identify significant factors and interactions.	2.1 Calculate the main effects of factors from a two-level factorial experiment. 2.2 Use a statistical software output to identify statistically significant factors and interactions at a given confidence level. 2.3 Construct a main effects plot and an interaction plot from experimental data. 2.4 Interpret the meaning of a significant interaction between two factors. 2.5 Explain the concept of analysis of variance (ANOVA) and its role in DOE.
3. Apply DOE principles to achieve process improvements and cost reductions in manufacturing processes.	3.1 Use the results of an experiment to recommend new optimal settings for a manufacturing process. 3.2 Predict the expected improvement in a process performance metric based on the new settings. 3.3 Formulate a report summarizing the findings of an experiment and the resulting process changes. 3.4 Calculate the potential cost savings associated with an improvement identified through a DOE project.

QC0003-08-Root Cause Analysis and Corrective Action

This unit focuses on finding the main reason why problems happen and how to fix them. Learners will learn different methods such as the "5 Whys," fishbone diagrams (Ishikawa), and cause-and-effect analysis. The unit also covers how to plan and apply corrective actions, and how to check if these actions have worked. It aims to prevent problems from happening again.

Learning Outcome:	Assessment Criteria:
1. **Identify root causes of quality issues and defects using root cause analysis (RCA) techniques such as fishbone diagrams and 5 Whys.**	1.1 Construct a fishbone (Ishikawa) diagram for a given quality problem, correctly populating the main branches (e.g., Man, Machine, Method, Material). 1.2 Apply the 5 Whys technique to a specific defect and document the logical progression to the root cause. 1.3 Identify potential contributing factors from a non-conformance report. 1.4 Differentiate between a symptom and a root cause.
2. **Implement corrective and preventive actions to address root causes and prevent recurrence of quality problems.**	2.1 Formulate a clear and actionable corrective action plan to address a documented root cause. 2.2 Explain the difference between a corrective action and a preventive action. 2.3 Describe the process for implementing and communicating a corrective action to relevant personnel. 2.4 Create a tracking log to monitor the status and completion of corrective actions. 2.5 Identify and document a potential preventive action based on a recurring trend or failure mode.
3. **Evaluate the effectiveness of corrective actions and monitor their implementation to ensure sustained improvement.**	3.1 Establish key performance indicators (KPIs) to measure the effectiveness of a corrective action. 3.2 Develop a monitoring plan to track the recurrence of a quality issue after a corrective action has been implemented. 3.3 Analyse data collected after a corrective action to determine if the quality problem has been resolved. 3.4 Present a summary report on the effectiveness of a corrective action, including a conclusion on its success and any further actions required.

QC0003-09-Advanced Quality Control Techniques

This unit introduces more detailed and modern methods used in quality control. Learners will study Six Sigma tools, advanced control charts, capability studies, and automated inspection systems. It will also cover digital tools and software used for real-time quality monitoring. This unit prepares learners to handle complex quality challenges in advanced mechanical processes.

Learning Outcome:	Assessment Criteria:
1. **Apply advanced quality control methodologies such as Six Sigma, Lean manufacturing, and Total Quality Management (TQM) to improve process efficiency and product quality.**	1.1 Explain the core principles and phases of the Six Sigma DMAIC (Define, Measure, Analyse, Improve, Control) methodology. 1.2 Describe the five principles of Lean manufacturing and provide examples of how they reduce waste in a production process. 1.3 Compare and contrast the goals and approaches of Six Sigma and Lean manufacturing. 1.4 Define the key elements of Total Quality Management (TQM) and its focus on organizational culture.
2. **Integrate advanced quality control tools and techniques into manufacturing processes for continuous improvement.**	2.1 Explain how to create a value stream map to identify waste in a process. 2.2 Use a Poka-Yoke (mistake-proofing) example to demonstrate how a simple device can prevent defects. 2.3 Propose the use of a specific advanced quality tool (e.g., Pareto chart, FMEA) to address a given quality problem. 2.4 Describe the role of a quality team or a Six Sigma Green Belt in a continuous improvement project. 2.5 Explain how statistical analysis is used in the 'Analyse' phase of a Six Sigma project.
3. **Lead quality improvement initiatives and projects to achieve organizational goals and objectives.**	3.1 Develop a project charter for a quality improvement initiative, including goals, scope, and team members. 3.2 Manage the execution of a small-scale quality improvement project, tracking progress and addressing roadblocks. 3.3 Communicate the progress and results of a quality project to both the project team and management. 3.4 Motivate and facilitate a quality improvement team to achieve project objectives.

QC0003-10-Quality Control in Supply Chain Management

This unit looks at how quality is managed across the supply chain, from raw materials to final delivery. Learners will understand how to check suppliers, inspect incoming goods, and ensure consistency from different sources. The unit also covers supplier audits, quality agreements, and ways to improve communication and performance within the supply chain.

Learning Outcome:	Assessment Criteria:
1. Understand the role of quality control in supply chain management and supplier quality assurance.	1.1 Describe the impact of supplier quality on an organization's final product quality and manufacturing costs. 1.2 Explain the purpose of a supplier quality manual or agreement. 1.3 Discuss the importance of a strong relationship with key suppliers to ensure consistent quality. 1.4 Identify the key stages in the supply chain where quality control is critical.
2. Evaluate supplier performance and quality metrics to ensure compliance with quality standards and specifications.	2.1 List and define at least three key metrics for measuring supplier performance (e.g., Defective Parts Per Million, On-Time Delivery). 2.2 Analyse a provided set of supplier data to identify a supplier with poor quality performance. 2.3 Propose a plan for a supplier audit, including the key areas to be reviewed. 2.4 Interpret a supplier scorecard and use it to justify a decision on whether to continue working with a supplier. 2.5 Explain the purpose of an incoming inspection process and its role in supplier quality.
3. Implement supply chain risk management strategies to mitigate quality-related risks and disruptions.	3.1 Identify and categorize at least three types of quality-related risks in a supply chain (e.g., single-source dependency, counterfeit parts). 3.2 Propose a mitigation strategy for a specific supply chain quality risk. 3.3 Develop a contingency plan for a scenario where a critical supplier fails to meet quality standards. 3.4 Explain the concept of supplier development and its role in risk mitigation.

QC0003-11-Quality Control in Product Development

This unit teaches how to build quality into products from the very beginning. Learners will learn about quality planning during design, how to review product specifications, and how to ensure that new designs meet customer needs and standards. Topics include design verification, validation, and quality tools like Quality Function Deployment (QFD) and Failure Mode and Effects Analysis (FMEA) during development stages.

Learning Outcome:	Assessment Criteria:
1. **Incorporate quality considerations into product design and development processes.**	1.1 Explain the concept of "prevention over detection" in the context of product development. 1.2 Describe the role of quality in each phase of a standard product development lifecycle (e.g., concept, design, manufacturing, launch). 1.3 Identify potential quality issues during the design phase of a mechanical component. 1.4 Justify the use of a design review process to identify and address quality risks early in development.
2. **Apply design for manufacturability (DFM) and design for assembly (DFA) principles to optimize product quality and manufacturing efficiency.**	2.1 Analyse a mechanical design and propose at least three specific DFM improvements to simplify manufacturing. 2.2 Evaluate an assembly sequence and suggest DFA changes to reduce part count or simplify the assembly process. 2.3 Explain how DFM and DFA principles reduce defects and non-conformances in the production phase. 2.4 Describe how the application of DFM/DFA can lead to cost savings and improved production throughput. 2.5 Provide examples of specific design features that are considered poor from a DFM or DFA perspective.
3. **Utilize quality function deployment (QFD) techniques to translate customer requirements into design specifications.**	3.1 Define the purpose and structure of a "House of Quality" matrix. 3.2 Populate a basic QFD matrix with customer requirements, technical characteristics, and the relationship matrix. 3.3 Analyse a completed QFD matrix to identify the most critical technical characteristics to focus on. 3.4 Explain how QFD helps a design team prioritize design decisions based on customer feedback.

ICTQual AB

Yew Tree Avenue, Dagenham,

London East,UnitedKingdom RM10 7FN

+447441398083

Support@ictqualab.co.uk|www.ictqualab.co.uk

VisitOfficialWebpage