



LICQual

# Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC/QA

## Qualification Specification

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# LICQual

## Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC / QA

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## Qualification Specifications about

# LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC / QA

### About LICQual

LICQual is a globally recognized awarding body based in the United Kingdom. Renowned for its commitment to excellence in education, LICQual specializes in delivering high-quality qualifications designed to meet the evolving needs of international learners, professionals, and industries. LICQual is dedicated to fostering innovative and flexible learning pathways, providing learners with the tools and knowledge to excel in dynamic professional landscapes. The organization emphasizes adherence to international qualification frameworks and standards, ensuring global recognition and applicability of its certifications.

The vision of LICQual is to establish itself as a global benchmark in quality education and skills development. Its mission is to equip individuals and organizations with internationally recognized qualifications that enhance employability, professional productivity, and academic progression.

Underpinned by a team of experienced professionals, including examiners, moderators, and assessors, LICQual ensures the highest standards of quality assurance and continuous improvement. Its qualifications are designed to empower individuals with the expertise and competencies necessary to thrive in today's competitive and ever-changing global environment.

### Course Overview

The LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance offers a strong foundation for professionals seeking to enhance their expertise in mechanical quality processes. This advanced qualification is tailored for individuals aiming to take on leadership roles in QC/QA within mechanical engineering or manufacturing environments.

This prestigious diploma is specifically designed for those who wish to deepen their knowledge of quality management principles, techniques, and practices in the mechanical engineering sector. It is ideal for professionals eager to advance their careers and gain recognition in the demanding field of quality assurance and control.

The program equips students with a comprehensive understanding of quality control systems, the crucial role of QA in manufacturing, and best practices for ensuring products meet high-quality standards. With a focus on practical, real-world applications, this diploma is perfect for individuals looking to enhance both their technical and managerial skills in the field of quality management.

## Certification Framework

<b>Qualification title</b>	LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC/ QA
<b>Course ID</b>	LICQ2200176
<b>Qualification Credits</b>	120 Credits
<b>Course Duration</b>	6 to 12 Months
<b>Grading Type</b>	Pass / Fail
<b>Competency Evaluation</b>	Coursework / Assignments / Verifiable Experience
<b>Assessment</b>	<p>The assessment and verification process for LICQual qualifications ensures that learners achieve the required standards and maintain consistency across all Approved Training Centres (ATCs). This process is divided into two key stages:</p> <p><b>Internal Assessment and Verification:</b></p> <ul style="list-style-type: none"> <li>✓ This stage is conducted by the staff at the ATC, ensuring that learners meet the qualification standards through ongoing assessments.</li> <li>✓ Internal Quality Assurance (IQA) is performed by the centre's designated IQA staff to validate and maintain the integrity of the assessment processes.</li> </ul> <p><b>External Quality Assurance:</b></p> <ul style="list-style-type: none"> <li>✓ This stage is overseen by LICQual AB verifiers, who periodically review the centre's assessment and IQA procedures.</li> <li>✓ The external verification ensures that assessments adhere to the required standards and that consistent practices are maintained across all centres.</li> </ul>

## Entry Requirements

To enroll in the LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC / QA, candidates should meet the following criteria:

- ✓ A Level 5 qualification in Mechanical Engineering, Quality Management, or a related field.
- ✓ Alternatively, a minimum of three years of experience in a mechanical engineering or quality control/assurance role may be considered in lieu of formal qualifications.
- ✓ Strong technical and analytical skills, with a passion for improving manufacturing processes.

## Qualification Structure

This qualification comprises 6 mandatory units, totaling 120 credits. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units		
Unit Ref#	Unit Title	Credits
LICQ2200176 - 1	Quality Management Systems (QMS) in Mechanical Engineering	20
LICQ2200176 - 2	Mechanical Testing and Evaluation Methods	20
LICQ2200176 - 3	Failure Analysis and Root Cause Investigation	20
LICQ2200176 - 4	Risk Management and Quality Control Strategies	20
LICQ2200176 - 5	Advanced Quality Assurance and Process Improvement	20
LICQ2200176 - 6	International Standards and Regulatory Compliance in Mechanical Engineering	20

## Centre Requirements

To ensure the quality and consistency of training, assessment, and learner support for the LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC / QA , centres must meet the following requirements:

### 1. Approval to Deliver the Qualification

- ✓ Centres must obtain formal approval from LICQual to deliver this specific qualification, regardless of prior registration.
- ✓ The approval process involves a review of resources, staff qualifications, and policies to confirm alignment with the program's standards.

### 2. Qualified Staff

- ✓ **Tutors:** Tutors delivering the LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance (QC/QA) must hold relevant qualifications in mechanical engineering or related disciplines at Level 7 or higher. They should possess substantial teaching experience or industrial expertise in mechanical QC/QA practices, ensuring effective delivery of the course content. Tutors must demonstrate the ability to relate theoretical concepts to practical applications in quality control and assurance within the mechanical engineering sector.
- ✓ **Assessors:** Assessors must hold recognized assessor qualifications, such as TAQA or equivalent, and possess extensive practical experience in mechanical QC/QA practices. This includes expertise in inspection, testing, and compliance management, ensuring assessments are carried out in accordance with industry standards. Assessors are expected to accurately evaluate learners' understanding of quality control processes and their application in real-world mechanical engineering scenarios.
- ✓ **Internal Quality Assurers (IQAs):** Internal Quality Assurers (IQAs) must hold formal IQA certifications and have proven experience in overseeing assessment quality within mechanical engineering or related fields. Their role is to ensure that assessment processes maintain high standards of quality and integrity, fostering continuous improvement and ensuring adherence to established guidelines and industry standards.

### 3. Learning Facilities

Centres must provide appropriate learning environments to support both theoretical and practical components of the program:

- ✓ **Classrooms:** Centers must provide modern classrooms that are equipped with multimedia tools for delivering interactive lessons on mechanical quality control principles. Classrooms should be well-resourced with access to relevant mechanical engineering standards, codes, and QA/QC frameworks to support learning.
- ✓ **Practical Areas:** Learning facilities should include well-equipped laboratories and simulated setups where learners can engage in mechanical testing, inspection, and compliance report preparation. These areas must reflect real-world mechanical engineering scenarios to ensure that learners gain practical experience in quality control and assurance.
- ✓ **Technology Access:** Learners should have access to advanced computers equipped with mechanical engineering software (e.g., CAD tools, simulation software, and QA/QC tracking systems). Reliable

internet connectivity and platforms for digital QA/QC management are essential to support research, collaborative project work, and the use of data analysis tools in quality assurance practices.

## 4. Health and Safety Compliance

- ✓ Centres must comply with relevant health and safety regulations, ensuring that learning environments are safe and accessible.
- ✓ Regular risk assessments must be conducted to uphold safety standards, particularly during practical training or fieldwork activities.

## 5. Resource Requirements

- ✓ **Learning Materials:** Approved manuals, textbooks, and supplementary resources aligned with the curriculum and learning outcomes.
- ✓ **Assessment Tools:** Templates, marking guides, and standardized forms for conducting and recording assessments.
- ✓ **E-Learning Systems:** If offering online or hybrid learning, centres must provide a robust Learning Management System (LMS) to deliver course content and facilitate assessments remotely.

## 6. Assessment and Quality Assurance

- ✓ Centres must follow LICQual's standards for assessments, ensuring they are fair, valid, and reliable.
- ✓ Internal Quality Assurance (IQA) processes must be implemented to monitor assessments and offer constructive feedback to assessors.
- ✓ External verification visits by LICQual will be conducted periodically to ensure compliance with awarding body standards.

## 7. Learner Support

Centres must provide learners with access to guidance and support throughout the program, including:

- ✓ Academic assistance for coursework and assessments.
- ✓ Career guidance to support professional progression.
- ✓ Additional support for learners with specific needs, such as disabilities or language barriers.

## 8. Policies and Procedures

Centres must maintain and implement the following policies, as required by LICQual:

- ✓ Equal Opportunities Policy.
- ✓ Health and Safety Policy.
- ✓ Safeguarding Policies and Procedures.
- ✓ Complaints and Appeals Procedures.
- ✓ Data Protection and Confidentiality Policy.

## 9. Regular Reporting to LICQual

- ✓ Centres must submit periodic updates to LICQual, including details on learner enrollment, progress, and completion rates.

- ✓ Comprehensive records of assessments and learner achievements must be maintained and made available for external auditing.

By meeting these rigorous requirements, centres can ensure the successful delivery of the LICQual Level 6 Diploma in Mechanical Quality Control and Quality Assurance QC / QA, providing learners with the highest quality education and professional development opportunities.

## Support for Candidates

Centres should ensure that materials developed to support candidates:

- ✓ Enable the tracking of learners' progress as they achieve the specified learning outcomes and assessment criteria.
- ✓ Provide clear guidance on accessing LICQual's policies and procedures.
- ✓ Establish robust mechanisms to allow Internal and External Quality Assurance personnel to verify and authenticate evidence efficiently.

This structured approach promotes transparency, enhances the learning experience for candidates, and ensures adherence to high-quality assurance standards.

## Assessment

This qualification is competence-based, requiring candidates to demonstrate their skills, knowledge, and understanding as outlined in the qualification units. The assessment is designed to measure candidates' proficiency against established standards. Key aspects include:

### 1. Assessment Process:

- ✓ Assessments must be conducted by qualified and experienced assessors.
- ✓ Candidates are required to compile a portfolio of evidence demonstrating achievement of 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

### LICQ2200176 – 1: Quality Management Systems (QMS) in Mechanical Engineering

The aim of this unit is to provide learners with a comprehensive understanding of the core principles, frameworks, and objectives of Quality Management Systems (QMS) in the context of mechanical engineering. Learners will explore the application of key QMS standards, such as ISO 9001, to ensure product quality and system reliability in mechanical engineering processes. This unit will enable learners to analyze the integration of QMS practices in mechanical projects to meet customer and regulatory requirements, as well as design tailored quality management strategies for manufacturing workflows. Additionally, learners will gain skills in implementing continuous monitoring and feedback mechanisms to enhance QMS performance in mechanical operations, driving improvements in product quality and operational efficiency.

<b>Learning Outcome:</b>	<b>1. Understand the core principles, frameworks, and objectives of Quality Management Systems (QMS) in mechanical engineering.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>1.1. Define the core principles and objectives of Quality Management Systems (QMS) in mechanical engineering, emphasizing their role in ensuring product and system reliability.</li> <li>1.2. Explain the key frameworks of QMS, such as ISO 9001, and their relevance to mechanical engineering practices.</li> <li>1.3. Identify the components of an effective QMS, including policy, quality objectives, procedures, and documentation, in the context of mechanical engineering.</li> <li>1.4. Analyze how QMS frameworks are implemented in mechanical engineering projects to maintain consistency and meet industry standards.</li> <li>1.5. Discuss the importance of continuous improvement within QMS and its impact on mechanical engineering processes.</li> <li>1.6. Evaluate the role of leadership and management commitment in the successful implementation of QMS in mechanical engineering organizations.</li> <li>1.7. Apply QMS principles to real-world mechanical engineering scenarios, ensuring product quality and process efficiency.</li> <li>1.8. Assess how QMS supports regulatory compliance and adherence to safety standards in mechanical engineering.</li> <li>1.9. Examine the integration of QMS with other management systems (e.g., Environmental Management Systems) in mechanical engineering projects.</li> </ol>
<b>Learning Outcome:</b>	<b>2. Evaluate the application of QMS standards (e.g., ISO 9001) to ensure product quality and system reliability.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>2.1 Analyze the principles and objectives of QMS standards such as ISO 9001 and their relevance to mechanical engineering systems.</li> <li>2.2 Assess the implementation of ISO 9001 standards in mechanical engineering projects to ensure product quality and system reliability.</li> <li>2.3 Identify key quality management practices within ISO 9001 that contribute to continuous improvement and customer satisfaction.</li> <li>2.4 Evaluate the effectiveness of QMS standards in addressing potential risks related to product defects, system failures, and non-compliance.</li> <li>2.5 Examine the integration of QMS standards with other industry-specific regulatory</li> </ol>

	<p>frameworks to ensure comprehensive quality control.</p> <p>2.6 Analyze case studies where the application of ISO 9001 or similar standards has improved product quality and system reliability in mechanical engineering.</p> <p>2.7 Recommend strategies for adapting QMS standards to specific project requirements while maintaining high-quality outcomes.</p> <p>2.8 Critically evaluate the role of internal audits and corrective actions in sustaining the effectiveness of QMS standards.</p> <p>2.9 Discuss the impact of QMS standards on overall organizational efficiency, operational costs, and customer satisfaction.</p>
<b>Learning Outcome:</b>	<b>3. Analyze the integration of QMS practices in mechanical engineering projects to meet customer and regulatory requirements.</b>
<b>Assessment Criteria:</b>	<p>3.1 Evaluate the alignment of Quality Management System (QMS) practices with customer requirements and expectations in mechanical engineering projects.</p> <p>3.2 Analyze how QMS practices contribute to compliance with relevant regulatory standards in mechanical engineering projects.</p> <p>3.3 Assess the effectiveness of QMS integration in ensuring product quality and system reliability throughout the project lifecycle.</p> <p>3.4 Identify key QMS components (e.g., documentation, process control, audits) and their role in meeting customer and regulatory requirements.</p> <p>3.5 Evaluate the impact of QMS practices on project timelines, cost-effectiveness, and overall project success.</p> <p>3.6 Examine case studies to assess how QMS integration has led to improved quality outcomes and regulatory compliance in mechanical engineering projects.</p> <p>3.7 Assess potential challenges in integrating QMS practices into mechanical engineering projects and recommend mitigation strategies.</p> <p>3.8 Analyze the role of continuous improvement within QMS practices to address changing customer needs and evolving regulatory requirements.</p> <p>3.9 Develop strategies for optimizing the integration of QMS practices to enhance project performance and compliance in mechanical engineering.</p>
<b>Learning Outcome:</b>	<b>4. Design quality management strategies tailored to mechanical engineering processes and manufacturing workflows.</b>
<b>Assessment Criteria:</b>	<p>4.1 Develop a detailed quality management strategy that aligns with the specific requirements of mechanical engineering processes and manufacturing workflows.</p> <p>4.2 Identify key quality objectives and performance indicators that are relevant to mechanical engineering operations.</p> <p>4.3 Assess the integration of quality management principles into various stages of mechanical manufacturing, from design through production to post-production.</p> <p>4.4 Demonstrate the application of industry-specific standards and regulations in the development of quality management strategies.</p> <p>4.5 Tailor quality control measures to address the unique challenges and risks within mechanical engineering processes, ensuring consistency and reliability.</p> <p>4.6 Utilize process mapping and workflow analysis to design strategies that improve efficiency, reduce waste, and ensure product quality.</p> <p>4.7 Recommend tools and techniques, such as statistical process control (SPC) or Six Sigma, to monitor and improve manufacturing quality.</p>

	<p>4.8 Evaluate the effectiveness of the designed strategies in enhancing product quality, operational efficiency, and meeting customer requirements.</p> <p>4.9 Develop a plan for continuous improvement that integrates feedback loops and adaptation to changes in manufacturing conditions.</p>
<b>Learning Outcome:</b>	<b>5. Implement continuous monitoring and feedback mechanisms to enhance QMS performance in mechanical operations.</b>
<b>Assessment Criteria:</b>	<p>5.1 Design and implement systems for continuous monitoring of key performance indicators (KPIs) within mechanical operations to track QMS performance.</p> <p>5.2 Establish feedback mechanisms that collect data on system performance, including operational efficiency, product quality, and compliance with standards.</p> <p>5.3 Utilize monitoring tools and software to capture real-time data related to mechanical processes and quality outcomes.</p> <p>5.4 Analyze feedback data to identify trends, bottlenecks, and areas for improvement in the mechanical system.</p> <p>5.5 Evaluate the effectiveness of current monitoring systems and adjust processes to enhance QMS performance.</p> <p>5.6 Develop protocols for timely response to feedback, ensuring corrective actions are taken to address performance issues.</p> <p>5.7 Ensure that feedback mechanisms support proactive quality management by fostering a culture of continuous improvement.</p> <p>5.8 Document and report findings from monitoring and feedback activities to relevant stakeholders for decision-making.</p> <p>5.9 Review the impact of implemented changes based on feedback, assessing improvements in system reliability, efficiency, and product quality.</p>

## LICQ2200176 – 2: Mechanical Testing and Evaluation Methods

The aim of this unit is to provide learners with a deep understanding of mechanical testing methods, including both destructive and non-destructive testing techniques, and their role in assessing material properties and product quality. Learners will develop the skills to conduct key mechanical tests, such as tensile, hardness, and fatigue tests, and interpret the results to evaluate material performance and suitability for specific applications. This unit will also enable learners to analyze test data to assess product quality and identify defects, while critically evaluating the effectiveness of various testing techniques in ensuring the integrity of mechanical systems.

<b>Learning Outcome:</b>	<b>1. Understand the principles and objectives of mechanical testing methods, including destructive and non-destructive testing techniques.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>1.1. Define the key principles of mechanical testing methods and their significance in assessing material properties and product quality.</li> <li>1.2. Differentiate between destructive and non-destructive testing techniques, providing examples of each.</li> <li>1.3. Explain the objectives of mechanical testing in evaluating material behavior under various conditions, such as stress, load, and temperature.</li> <li>1.4. Identify the primary mechanical testing methods, including tensile, hardness, fatigue, and ultrasonic testing, and their specific applications.</li> <li>1.5. Describe the advantages and limitations of destructive testing methods in mechanical engineering contexts.</li> <li>1.6. Evaluate the benefits of non-destructive testing techniques in preserving material integrity while ensuring compliance with quality standards.</li> <li>1.7. Discuss the role of international standards (e.g., ASTM, ISO) in governing mechanical testing methods.</li> <li>1.8. Assess the relevance of mechanical testing in ensuring safety, reliability, and durability of mechanical systems and components.</li> <li>1.9. Illustrate how testing results are used to make informed decisions in mechanical design, manufacturing, and quality assurance processes.</li> </ol>
<b>Learning Outcome:</b>	<b>2. Demonstrate the ability to conduct mechanical tests (e.g., tensile, hardness, fatigue) and interpret their results.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>2.1 Perform tensile tests to determine the mechanical properties of materials, including ultimate strength, yield strength, and elongation.</li> <li>2.2 Conduct hardness tests using methods such as Brinell, Rockwell, or Vickers, and accurately record the results.</li> <li>2.3 Carry out fatigue tests to evaluate the endurance limit and failure behavior of materials under cyclic loading conditions.</li> <li>2.4 Prepare specimens according to standardized testing protocols to ensure reliable and repeatable results.</li> <li>2.5 Operate mechanical testing equipment in compliance with safety regulations and manufacturer guidelines.</li> <li>2.6 Analyze test data to identify material characteristics and assess suitability for specific applications.</li> <li>2.7 Compare test outcomes against industry standards and specifications to evaluate</li> </ol>

	<p>material performance.</p> <p>2.8 Identify potential errors or anomalies in test results and recommend corrective measures.</p> <p>2.9 Document and present mechanical test findings clearly, including graphs, tables, and interpretations of results.</p>
<b>Learning Outcome:</b>	<b>3. Analyze test data to assess material properties, performance characteristics, and suitability for specific applications.</b>
<b>Assessment Criteria:</b>	<p>3.1 Interpret mechanical test data to determine material properties, including strength, hardness, and elasticity.</p> <p>3.2 Evaluate performance characteristics based on test results, such as durability, fatigue resistance, and thermal behavior.</p> <p>3.3 Compare material properties against project specifications to determine suitability for intended applications.</p> <p>3.4 Identify potential deviations or anomalies in test data and assess their impact on material performance.</p> <p>3.5 Utilize statistical methods to analyze test data for accuracy and reliability.</p> <p>3.6 Assess the compatibility of materials with environmental and operational conditions based on test findings.</p> <p>3.7 Document and present findings from test data analysis to support decision-making in material selection.</p> <p>3.8 Recommend alternative materials or treatments when test data indicates deficiencies in meeting application requirements.</p> <p>3.9 Review case studies or project scenarios to apply test data analysis techniques in practical contexts.</p>
<b>Learning Outcome:</b>	<b>4. Evaluate the effectiveness of various mechanical testing techniques in identifying defects and ensuring product quality.</b>
<b>Assessment Criteria:</b>	<p>4.1 Analyze the principles and methodologies of different mechanical testing techniques, including their scope and limitations.</p> <p>4.2 Assess the suitability of destructive testing methods, such as tensile and impact tests, for identifying material defects.</p> <p>4.3 Evaluate the application of non-destructive testing (NDT) methods, such as ultrasonic and radiographic testing, in detecting hidden flaws.</p> <p>4.4 Compare the effectiveness of mechanical testing techniques in ensuring compliance with industry standards and specifications.</p> <p>4.5 Interpret testing results to determine their accuracy in identifying defects and assessing material quality.</p> <p>4.6 Critically review case studies showcasing the success or failure of mechanical testing techniques in quality assurance.</p> <p>4.7 Demonstrate the ability to select appropriate testing methods based on material type, intended application, and defect characteristics.</p> <p>4.8 Investigate the role of advanced mechanical testing technologies in improving defect detection and quality control.</p> <p>4.9 Provide recommendations for integrating multiple testing techniques to enhance overall reliability and product quality.</p>
<b>Learning Outcome:</b>	<b>5. Apply advanced testing technologies to optimize mechanical system design and</b>

	<b>functionality.</b>
<b>Assessment Criteria:</b>	<ul style="list-style-type: none"> <li>5.1. Identify appropriate advanced testing technologies for specific mechanical system design requirements.</li> <li>5.2. Demonstrate the use of advanced testing tools to evaluate system performance under various operating conditions.</li> <li>5.3. Analyze testing data to identify potential design flaws and recommend optimization strategies.</li> <li>5.4. Integrate results from advanced testing methods into the mechanical design process to enhance functionality.</li> <li>5.5. Evaluate the impact of testing technologies on improving system efficiency and reliability.</li> <li>5.6. Ensure compliance with industry standards and best practices when applying advanced testing technologies.</li> <li>5.7. Conduct comparative assessments of different testing technologies to determine their suitability for specific applications.</li> <li>5.8. Document testing procedures and results to support continuous improvement in mechanical system design.</li> <li>5.9. Develop recommendations for future design improvements based on insights gained from advanced testing technologies.</li> </ul>

**LICQ2200176 – 3: Failure Analysis and Root Cause Investigation**

The aim of this unit is to equip learners with the knowledge and skills to effectively conduct failure analysis and root cause investigations in mechanical systems and components. Learners will understand the principles and methodologies of failure analysis, enabling them to identify common failure modes such as fatigue, corrosion, and wear. This unit will teach learners to apply root cause analysis (RCA) techniques, including tools like Fishbone Diagrams and Fault Tree Analysis, to diagnose and address failures. Learners will evaluate the impact of failure causes on system performance, safety, and operational continuity, and develop strategies for corrective actions and preventive measures to minimize recurrence and enhance the overall reliability and performance of mechanical systems.

<b>Learning Outcome:</b>	<b>1. Understand the principles and methodologies of failure analysis in mechanical systems and components.</b>
<b>Assessment Criteria:</b>	<ul style="list-style-type: none"> <li>1.1. Define the key principles and objectives of failure analysis in mechanical systems.</li> <li>1.2. Describe common methodologies used in failure analysis, including visual inspections, material testing, and fracture analysis.</li> <li>1.3. Explain the importance of failure analysis in improving mechanical system reliability and safety.</li> <li>1.4. Identify the steps involved in conducting a systematic failure analysis for mechanical components.</li> <li>1.5. Differentiate between destructive and non-destructive testing techniques used in failure analysis.</li> <li>1.6. Discuss the role of advanced diagnostic tools (e.g., scanning electron microscopy, X-ray analysis) in identifying failure mechanisms.</li> <li>1.7. Analyze case studies to illustrate the application of failure analysis methodologies in resolving mechanical failures.</li> <li>1.8. Evaluate the effectiveness of failure analysis in preventing future breakdowns and enhancing system performance.</li> <li>1.9. Recommend best practices for documenting and reporting findings from failure analysis investigations.</li> </ul>
<b>Learning Outcome:</b>	<b>2. Identify common failure modes in mechanical engineering, such as fatigue, corrosion, and wear.</b>
<b>Assessment Criteria:</b>	<ul style="list-style-type: none"> <li>2.1 List and describe the characteristics of fatigue as a common failure mode in mechanical engineering.</li> <li>2.2 Explain the mechanisms and conditions that lead to corrosion in mechanical systems and components.</li> <li>2.3 Analyze the causes and effects of wear on mechanical parts in different operational environments.</li> <li>2.4 Differentiate between surface fatigue and internal fatigue failure modes with examples.</li> <li>2.5 Identify the environmental factors and material properties that contribute to corrosion-related failures.</li> <li>2.6 Examine case studies of mechanical failures caused by wear and suggest preventive measures.</li> <li>2.7 Assess the role of material selection in minimizing the risk of fatigue, corrosion,</li> </ul>

	<p>and wear.</p> <p>2.8 Demonstrate understanding of diagnostic techniques for detecting early signs of fatigue, corrosion, and wear in mechanical systems.</p> <p>2.9 Evaluate the impact of maintenance practices on reducing the likelihood of these common failure modes.</p>
<b>Learning Outcome:</b>	<b>3. Apply root cause analysis (RCA) techniques to diagnose and address failures in mechanical systems (e.g., Fishbone Diagram, Fault Tree Analysis).</b>
<b>Assessment Criteria:</b>	<p>3.1 Identify the principles and objectives of root cause analysis (RCA) in diagnosing failures in mechanical systems.</p> <p>3.2 Select appropriate RCA techniques, such as Fishbone Diagrams and Fault Tree Analysis, based on the nature of the failure.</p> <p>3.3 Collect and organize relevant data for conducting a thorough RCA investigation.</p> <p>3.4 Create visual representations, including diagrams, to map out potential failure causes and their interconnections.</p> <p>3.5 Analyze failure patterns and contributing factors using selected RCA techniques.</p> <p>3.6 Develop actionable solutions based on RCA findings to address the identified root causes.</p> <p>3.7 Evaluate the effectiveness of proposed solutions in preventing recurrence of similar failures.</p> <p>3.8 Document the RCA process and results in compliance with industry best practices.</p> <p>3.9 Communicate findings and recommendations to stakeholders to ensure alignment and implementation.</p>
<b>Learning Outcome:</b>	<b>4. Evaluate the impact of identified failure causes on system performance, safety, and operational continuity.</b>
<b>Assessment Criteria:</b>	<p>4.1 Analyze the relationship between specific failure causes and their effects on overall system performance.</p> <p>4.2 Assess the influence of identified failure causes on the efficiency and functionality of mechanical systems.</p> <p>4.3 Evaluate the potential risks to safety arising from mechanical failures, considering industry safety standards.</p> <p>4.4 Examine how operational continuity is disrupted by various failure causes in mechanical processes.</p> <p>4.5 Interpret failure analysis data to quantify the extent of performance degradation caused by specific issues.</p> <p>4.6 Identify cascading effects of failure causes on interconnected components and system reliability.</p> <p>4.7 Assess the financial and operational implications of failure-induced downtime on project delivery.</p> <p>4.8 Recommend strategies to mitigate the negative impacts of identified failure causes on system safety and performance.</p> <p>4.9 Critically evaluate case studies of mechanical failures to understand their broader impacts on system reliability and safety.</p>
<b>Learning Outcome:</b>	<b>5. Develop and implement corrective actions and preventive measures to minimize recurrence and enhance system reliability.</b>
<b>Assessment Criteria:</b>	<p>5.1. Identify common failure modes and their root causes to design appropriate</p>



	<p>corrective and preventive measures.</p> <ol style="list-style-type: none"><li>5.2. Evaluate the effectiveness of existing processes in mitigating system failures and recommend improvements.</li><li>5.3. Develop corrective action plans that address identified issues and align with industry best practices.</li><li>5.4. Implement preventive measures to reduce the likelihood of recurrence, ensuring long-term system reliability.</li><li>5.5. Utilize data-driven approaches, such as trend analysis and historical performance reviews, to inform corrective and preventive actions.</li><li>5.6. Document and communicate corrective and preventive measures to relevant stakeholders for effective implementation.</li><li>5.7. Monitor the implementation of corrective actions and preventive measures to ensure compliance with established standards.</li><li>5.8. Assess the impact of corrective and preventive measures on overall system performance and operational efficiency.</li><li>5.9. Conduct periodic reviews and updates to corrective and preventive strategies based on feedback and evolving system needs.</li></ol>
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## LICQ2200176 – 4: Risk Management and Quality Control Strategies

The aim of this unit is to provide learners with a comprehensive understanding of risk assessment and quality control principles within mechanical engineering. Learners will gain the ability to identify and analyze potential risks associated with mechanical systems and processes, including operational, safety, and environmental risks. This unit will enable learners to prioritize risks using tools such as FMEA (Failure Mode and Effects Analysis) and risk matrices, and design effective quality control measures to mitigate risks and ensure product compliance. Additionally, learners will evaluate the effectiveness of risk management and quality control strategies in enhancing mechanical system performance, ensuring that both quality and safety standards are met.

<b>Learning Outcome:</b>	<b>1. Understand the principles of risk assessment and quality control in mechanical engineering contexts.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>1.1. Define the key principles of risk assessment in mechanical engineering, including the identification, evaluation, and prioritization of potential risks.</li> <li>1.2. Explain the importance of quality control in mechanical engineering and its role in ensuring product reliability and safety.</li> <li>1.3. Describe various risk assessment methodologies used in mechanical engineering, such as FMEA (Failure Mode and Effects Analysis) and fault tree analysis.</li> <li>1.4. Demonstrate understanding of how risk management strategies are integrated with quality control processes to mitigate risks in mechanical systems.</li> <li>1.5. Evaluate the role of quality control tools, such as statistical process control (SPC) and Six Sigma, in managing risk and ensuring quality.</li> <li>1.6. Identify different types of risks associated with mechanical engineering processes, including operational, safety, and environmental risks.</li> <li>1.7. Assess the relationship between risk management and the overall quality of mechanical engineering systems and products.</li> <li>1.8. Discuss industry standards and regulations related to risk management and quality control in mechanical engineering.</li> <li>1.9. Illustrate how effective risk assessment and quality control can lead to improvements in product quality, system performance, and operational safety.</li> </ol>
<b>Learning Outcome:</b>	<b>2. Identify potential risks associated with mechanical systems and processes, including operational, safety, and environmental risks.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>2.1 Identify and categorize different types of risks associated with mechanical systems, such as operational, safety, and environmental risks.</li> <li>2.2 Evaluate the impact of operational risks, including equipment failures, downtime, and production inefficiencies, on overall system performance.</li> <li>2.3 Analyze safety risks related to mechanical systems, including hazards that could result in accidents, injuries, or damage to personnel and equipment.</li> <li>2.4 Assess environmental risks, such as emissions, waste, and energy consumption, and their potential effect on sustainability and compliance with environmental regulations.</li> <li>2.5 Use risk identification tools, such as hazard analysis or risk matrices, to detect potential issues in mechanical systems.</li> <li>2.6 Prioritize identified risks based on their severity, likelihood, and potential consequences for mechanical systems and processes.</li> </ol>

	<p>2.7 Investigate past incidents or case studies to understand how similar risks have impacted mechanical operations and their resolution.</p> <p>2.8 Communicate identified risks and their implications to relevant stakeholders, ensuring proper documentation and reporting.</p> <p>2.9 Recommend preventive measures or mitigation strategies to address and reduce identified risks in mechanical systems.</p>
<b>Learning Outcome:</b>	<b>3. Analyze and prioritize risks using tools such as FMEA (Failure Mode and Effects Analysis) and risk matrices.</b>
<b>Assessment Criteria:</b>	<p>3.1 Demonstrate the ability to apply FMEA (Failure Mode and Effects Analysis) to identify potential failure modes in mechanical systems and processes.</p> <p>3.2 Evaluate the likelihood and impact of each failure mode using FMEA methodology, assigning appropriate severity, occurrence, and detection ratings.</p> <p>3.3 Prioritize risks by calculating the Risk Priority Number (RPN) for each failure mode in accordance with standard FMEA practices.</p> <p>3.4 Utilize risk matrices to assess the relative risk of different failure modes, categorizing them based on likelihood and impact.</p> <p>3.5 Interpret the results of FMEA and risk matrices to identify critical risk areas that require immediate attention or mitigation.</p> <p>3.6 Compare and contrast the effectiveness of FMEA and risk matrices in prioritizing risks within mechanical engineering contexts.</p> <p>3.7 Recommend appropriate risk mitigation strategies based on the prioritization of failure modes, aligning with industry best practices.</p> <p>3.8 Demonstrate the application of FMEA and risk matrices in real-world mechanical engineering scenarios, such as design reviews or system reliability assessments.</p> <p>3.9 Evaluate the effectiveness of risk prioritization and mitigation measures in improving system performance and reducing operational risks.</p>
<b>Learning Outcome:</b>	<b>4. Design and implement effective quality control measures to mitigate risks and ensure product compliance.</b>
<b>Assessment Criteria:</b>	<p>4.1 Develop a comprehensive quality control plan that aligns with industry standards and regulations to ensure product compliance.</p> <p>4.2 Identify potential risks in the production process and design quality control measures to mitigate these risks effectively.</p> <p>4.3 Apply appropriate quality control techniques and tools (e.g., statistical process control, inspection protocols) to monitor product quality.</p> <p>4.4 Implement inspection and testing procedures at various stages of production to ensure consistency and compliance with design specifications.</p> <p>4.5 Demonstrate the ability to use risk assessment tools (e.g., FMEA) to prioritize risks and focus quality control efforts where they are most needed.</p> <p>4.6 Ensure that all quality control measures are documented and traceable to demonstrate adherence to regulatory and quality standards.</p> <p>4.7 Analyze product data and feedback from quality control processes to identify areas for continuous improvement.</p> <p>4.8 Collaborate with relevant stakeholders (e.g., production teams, suppliers) to ensure effective implementation of quality control measures across the production cycle.</p>

	4.9 Evaluate the effectiveness of implemented quality control measures in reducing defects, ensuring compliance, and improving product reliability.
<b>Learning Outcome:</b>	<b>5. Evaluate the effectiveness of risk management and quality control strategies in improving mechanical system performance.</b>
<b>Assessment Criteria:</b>	<p>5.1. Assess the impact of risk management and quality control strategies on the overall performance of mechanical systems in real-world scenarios.</p> <p>5.2. Identify key performance indicators (KPIs) to evaluate the success of implemented risk management and quality control strategies.</p> <p>5.3. Analyze how risk management practices address specific mechanical system failures and mitigate operational risks.</p> <p>5.4. Evaluate the role of quality control measures in enhancing product reliability and reducing defects within mechanical systems.</p> <p>5.5. Examine case studies or examples where risk management and quality control strategies have improved system performance in mechanical engineering projects.</p> <p>5.6. Compare and contrast different risk management frameworks and quality control techniques, assessing their relative effectiveness in various mechanical system contexts.</p> <p>5.7. Evaluate the contribution of proactive vs. reactive approaches to risk management and quality control in enhancing system reliability and efficiency.</p> <p>5.8. Determine the long-term benefits of integrating risk management and quality control strategies, focusing on system sustainability and cost-effectiveness.</p> <p>5.9. Provide recommendations for optimizing risk management and quality control strategies to improve mechanical system performance in future projects.</p>

## LICQ2200176– 5: Advanced Quality Assurance and Process Improvement

The aim of this unit is to provide learners with an in-depth understanding of advanced quality assurance (QA) techniques and their application in mechanical engineering projects. Learners will develop the ability to apply statistical tools, such as Six Sigma and Statistical Process Control (SPC), to monitor and improve process efficiency and product quality. This unit will enable learners to analyze process performance data to identify areas for improvement in mechanical manufacturing and design workflows, and develop strategies for continuous process improvement using approaches like lean manufacturing and agile practices. Additionally, learners will evaluate the impact of quality assurance initiatives on overall system productivity, cost-effectiveness, and customer satisfaction, ensuring a high standard of operational excellence and continuous improvement.

<b>Learning Outcome:</b>	<b>1. Understand the role of advanced quality assurance (QA) techniques in mechanical engineering projects.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>1.1. Define the concept of advanced quality assurance (QA) and its importance in mechanical engineering projects.</li> <li>1.2. Explain the role of advanced QA techniques in enhancing product quality, system reliability, and overall project success.</li> <li>1.3. Identify various advanced QA techniques used in mechanical engineering, such as Six Sigma, Statistical Process Control (SPC), and Total Quality Management (TQM).</li> <li>1.4. Demonstrate an understanding of how advanced QA techniques contribute to process optimization and waste reduction in mechanical engineering.</li> <li>1.5. Evaluate the impact of QA techniques on meeting customer specifications, regulatory compliance, and industry standards.</li> <li>1.6. Analyze the integration of advanced QA methods with other project management practices to ensure continuous improvement.</li> <li>1.7. Assess the benefits of using advanced QA techniques for identifying and addressing potential quality issues before they impact production.</li> <li>1.8. Apply advanced QA methods to real-world mechanical engineering project scenarios, illustrating their effectiveness in quality control.</li> <li>1.9. Discuss the role of QA in fostering a culture of quality within mechanical engineering teams and organizations.</li> </ol>
<b>Learning Outcome:</b>	<b>2. Apply statistical tools (e.g., Six Sigma, SPC) to monitor and improve process efficiency and product quality.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>2.1 Demonstrate the ability to select appropriate statistical tools, such as Six Sigma or Statistical Process Control (SPC), based on process requirements and objectives.</li> <li>2.2 Apply Six Sigma methodologies to identify process variations and eliminate inefficiencies, ensuring improved product quality and consistency.</li> <li>2.3 Use SPC techniques to monitor and control process performance, identifying trends and deviations in real-time to maintain product quality standards.</li> <li>2.4 Analyze data from statistical tools to assess process capability and identify areas for improvement in manufacturing workflows.</li> <li>2.5 Interpret statistical data results to make informed decisions on process adjustments and improvements.</li> <li>2.6 Calculate key metrics, such as process capability indices (Cp, Cpk), using statistical</li> </ol>

	<p>tools to assess the effectiveness of quality control measures.</p> <p>2.7 Apply control charts to monitor and detect out-of-control conditions, taking corrective actions to improve process stability and product quality.</p> <p>2.8 Evaluate the effectiveness of implemented statistical tools in improving process efficiency and product consistency.</p> <p>2.9 Recommend process optimization strategies based on the findings from statistical analyses to enhance product quality and reduce waste.</p>
<b>Learning Outcome:</b>	<b>3. Analyze process performance data to identify areas for improvement in mechanical manufacturing and design workflows.</b>
<b>Assessment Criteria:</b>	<p>3.1 Collect and organize process performance data from mechanical manufacturing and design workflows to ensure completeness and accuracy.</p> <p>3.2 Evaluate key performance indicators (KPIs) to assess the efficiency and effectiveness of existing manufacturing and design processes.</p> <p>3.3 Apply data analysis techniques, such as statistical analysis or process mapping, to identify bottlenecks or inefficiencies in workflows.</p> <p>3.4 Compare current process performance data with industry benchmarks or best practices to highlight areas of underperformance.</p> <p>3.5 Identify potential root causes of inefficiencies or quality issues using data-driven insights and performance trends.</p> <p>3.6 Prioritize areas for improvement based on their impact on system performance, cost, and customer satisfaction.</p> <p>3.7 Recommend corrective actions or process changes that are supported by data analysis to improve overall workflow efficiency.</p> <p>3.8 Develop strategies for monitoring and measuring the effectiveness of improvements made to manufacturing and design processes.</p> <p>3.9 Evaluate the long-term sustainability of process improvements by considering factors like scalability, cost-effectiveness, and operational risk.</p>
<b>Learning Outcome:</b>	<b>4. Develop and implement strategies for continuous process improvement, including lean manufacturing and agile practices.</b>
<b>Assessment Criteria:</b>	<p>4.1 Identify key principles of continuous process improvement and explain their relevance to mechanical engineering processes.</p> <p>4.2 Analyze the current processes to identify inefficiencies and areas for improvement using process mapping and data analysis techniques.</p> <p>4.3 Design strategies for continuous improvement that incorporate lean manufacturing principles, such as waste reduction, value stream mapping, and just-in-time production.</p> <p>4.4 Apply agile practices to mechanical engineering workflows to improve flexibility, speed, and responsiveness to changes in project requirements.</p> <p>4.5 Develop action plans to implement the identified process improvement strategies across various stages of mechanical production.</p> <p>4.6 Monitor the implementation of improvement strategies and collect data to evaluate their effectiveness in real-time.</p> <p>4.7 Assess the impact of lean and agile strategies on process efficiency, cost reduction, and overall system performance.</p> <p>4.8 Recommend corrective actions if the initial implementation does not meet</p>

	<p>expected outcomes or performance standards.</p> <p>4.9 Demonstrate the ability to foster a culture of continuous improvement within teams, encouraging collaboration and proactive problem-solving.</p>
<b>Learning Outcome:</b>	<b>5. Evaluate the impact of quality assurance initiatives on overall system productivity, cost-effectiveness, and customer satisfaction.</b>
<b>Assessment Criteria:</b>	<p>5.1. Assess the direct relationship between quality assurance initiatives and system productivity, including improvements in process efficiency and output.</p> <p>5.2. Analyze how quality assurance practices contribute to cost-effectiveness by reducing waste, defects, and rework in the production process.</p> <p>5.3. Evaluate the influence of quality assurance initiatives on customer satisfaction, including product reliability, performance, and adherence to customer specifications.</p> <p>5.4. Measure the long-term impact of quality assurance on operational costs and profitability by comparing pre- and post-implementation metrics.</p> <p>5.5. Examine the role of quality assurance in reducing system downtime and enhancing overall equipment effectiveness (OEE).</p> <p>5.6. Assess the effectiveness of continuous improvement processes in quality assurance to drive sustained productivity gains.</p> <p>5.7. Evaluate customer feedback and quality metrics to determine how quality assurance initiatives align with customer expectations and satisfaction levels.</p> <p>5.8. Critically assess case studies or real-world examples to determine the broader impact of quality assurance on company reputation and market competitiveness.</p> <p>5.9. Recommend strategies for optimizing quality assurance initiatives to maximize productivity, cost-effectiveness, and customer satisfaction.</p>

## LICQ2200176 – 6: International Standards and Regulatory Compliance in Mechanical Engineering

The aim of this unit is to provide learners with a thorough understanding of the international standards and regulatory requirements that govern mechanical engineering practices. Learners will explore key standards, such as ISO 14001 and ASME codes, and their application to mechanical systems. The unit will enable learners to analyze regulatory requirements and their implications for achieving global compliance, as well as demonstrate knowledge of certification processes for mechanical products and systems. Learners will also evaluate the risks and consequences of non-compliance and apply compliance frameworks to ensure adherence to safety, environmental, and operational standards in mechanical engineering projects, fostering global best practices and regulatory alignment.

<b>Learning Outcome:</b>	<b>1. Understand the international standards governing mechanical engineering practices (e.g., ISO 14001, ASME codes).</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>1.1. Identify key international standards relevant to mechanical engineering, such as ISO 14001, ASME codes, and other industry-specific regulations.</li> <li>1.2. Explain the principles and objectives of ISO 14001 and its application in mechanical engineering practices, focusing on environmental management systems.</li> <li>1.3. Describe the importance of ASME codes and their role in governing mechanical design, manufacturing, and safety standards.</li> <li>1.4. Analyze how international standards influence global mechanical engineering practices, ensuring consistency and quality across different regions.</li> <li>1.5. Compare and contrast various international standards applicable to mechanical engineering, identifying their scope and areas of focus.</li> <li>1.6. Evaluate the role of these standards in ensuring compliance, safety, and sustainability within mechanical engineering projects.</li> <li>1.7. Demonstrate knowledge of the certification processes for mechanical systems in line with international standards and regulatory requirements.</li> <li>1.8. Assess the impact of international standards on the design, manufacturing, and operational phases of mechanical engineering projects.</li> <li>1.9. Recommend best practices for integrating international standards into mechanical engineering workflows to achieve regulatory compliance and industry excellence.</li> </ol>
<b>Learning Outcome:</b>	<b>2. Analyze the regulatory requirements for mechanical systems and their implications for global compliance.</b>
<b>Assessment Criteria:</b>	<ol style="list-style-type: none"> <li>2.1 Identify key international and regional regulatory frameworks that govern mechanical systems and engineering practices.</li> <li>2.2 Evaluate the scope and purpose of specific regulatory requirements for mechanical systems in various industries.</li> <li>2.3 Analyze the implications of non-compliance with regulatory standards in different jurisdictions and sectors.</li> <li>2.4 Assess how regulatory requirements impact the design, manufacture, and operation of mechanical systems.</li> <li>2.5 Investigate the role of global compliance in ensuring safety, environmental protection, and operational efficiency in mechanical systems.</li> </ol>



	<p>2.6 Examine the relationship between regulatory compliance and certification processes for mechanical products and systems.</p> <p>2.7 Apply regulatory compliance requirements to real-world mechanical system scenarios and assess their effectiveness in meeting safety and operational standards.</p> <p>2.8 Analyze the challenges and risks organizations face in maintaining global compliance for mechanical systems, considering variations in regional standards.</p> <p>2.9 Recommend strategies for mechanical systems to comply with international standards and regulations while minimizing operational and legal risks.</p>
<b>Learning Outcome:</b>	<b>3. Demonstrate knowledge of the certification processes for mechanical products and systems according to international standards.</b>
<b>Assessment Criteria:</b>	<p>3.1 Explain the certification processes for mechanical products and systems according to international standards such as ISO, ASME, and other relevant regulatory frameworks.</p> <p>3.2 Identify the key steps involved in the certification process, including documentation, testing, and compliance verification.</p> <p>3.3 Demonstrate an understanding of the requirements for obtaining certification for mechanical systems and products, including safety, environmental, and operational considerations.</p> <p>3.4 Assess the role of certification bodies and their authority in validating compliance with international standards.</p> <p>3.5 Analyze the impact of certification on product quality, reliability, and market acceptance.</p> <p>3.6 Evaluate the differences in certification requirements across various international markets and their implications for global trade.</p> <p>3.7 Discuss the challenges and common issues faced during the certification process and how to address them.</p> <p>3.8 Interpret certification standards and guidelines to ensure alignment with industry best practices and regulatory demands.</p> <p>3.9 Recommend strategies for ensuring ongoing compliance and recertification to maintain standards and product integrity over time.</p>
<b>Learning Outcome:</b>	<b>4. Evaluate the risks and consequences of non-compliance in mechanical engineering practices.</b>
<b>Assessment Criteria:</b>	<p>4.1 Identify common instances of non-compliance in mechanical engineering practices and their potential causes.</p> <p>4.2 Analyze the direct and indirect risks associated with non-compliance, including safety hazards, operational disruptions, and legal ramifications.</p> <p>4.3 Assess the financial consequences of non-compliance, such as fines, penalties, and costs associated with rectifying non-compliant systems.</p> <p>4.4 Evaluate the impact of non-compliance on system performance, including reduced reliability, functionality, and overall product quality.</p> <p>4.5 Examine the implications of non-compliance for environmental sustainability and regulatory penalties related to environmental standards.</p> <p>4.6 Analyze case studies of non-compliance in mechanical engineering, identifying key lessons and outcomes.</p>

	<p>4.7 Recommend corrective actions and preventive measures to mitigate the risks and consequences of non-compliance in future projects.</p> <p>4.8 Evaluate the role of compliance audits and inspections in identifying and preventing non-compliance risks.</p> <p>4.9 Discuss the potential long-term consequences of non-compliance on a company's reputation and customer trust.</p>
<b>Learning Outcome:</b>	<b>5. Apply compliance frameworks to ensure adherence to safety, environmental, and operational standards in mechanical engineering projects.</b>
<b>Assessment Criteria:</b>	<p>5.1 Identify relevant international and regional compliance frameworks applicable to safety, environmental, and operational standards in mechanical engineering projects.</p> <p>5.2 Apply compliance frameworks to assess the safety, environmental, and operational risks associated with mechanical engineering projects.</p> <p>5.3 Ensure that all mechanical engineering processes meet established safety standards and regulations through appropriate frameworks and practices.</p> <p>5.4 Analyze the impact of non-compliance with safety, environmental, and operational standards on project outcomes and stakeholders.</p> <p>5.5 Develop procedures and protocols to ensure ongoing compliance with regulatory requirements throughout the lifecycle of a mechanical engineering project.</p> <p>5.6 Conduct regular audits and inspections to verify adherence to compliance frameworks in mechanical systems and operations.</p> <p>5.7 Recommend corrective actions to address any gaps or deficiencies in compliance with safety, environmental, and operational standards.</p> <p>5.8 Evaluate the effectiveness of compliance frameworks in mitigating risks and enhancing the sustainability of mechanical engineering projects.</p> <p>5.9 Maintain accurate records and documentation to demonstrate compliance with safety, environmental, and operational standards during the project execution phase.</p>

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