

ICTQual AB



Qualification Specification

ICTQual AB Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical



Website
www.ictqualab.co.uk

Email:
support@ictqualab.co.uk



ICTQual AB's

Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical

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Qualification Specification about

ICTQual AB Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical

About ICTQual AB's

ICTQual AB 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

The **ICTQual Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical** is a premier, advanced-level qualification designed for professionals ready to transition into senior management and consultancy roles. This programme bridges the gap between technical electrical proficiency and strategic quality leadership. In an era of rapid digital transformation, this diploma goes beyond traditional inspection. It integrates modern methodologies—such as **Building Information Modelling (BIM)** and **sustainable engineering practices**—with rigorous international standards to ensure electrical systems are safe, reliable, and future-proof.

Course Objectives

The primary objective of this qualification is to transform experienced technicians and engineers into strategic quality leaders. By the end of the programme, learners will be able to:

- **Lead & Manage:** Direct QA/QC teams and oversee departmental operations within complex electrical projects.
- **System Implementation:** Design and implement advanced Quality Management Systems (QMS) aligned with international benchmarks.
- **Risk & Compliance:** Master project risk assessment and ensure strict adherence to safety and regulatory standards.
- **Advanced Evaluation:** Apply Non-Destructive Evaluation (NDE) techniques and digital tools like BIM for enhanced project oversight.
- **Strategic Research:** Conduct high-level research and data analysis to solve real-world engineering challenges and drive continuous improvement.

Aims of the Qualification

This diploma is designed to provide more than just a certificate; it aims to build a professional identity focused on excellence. The programme's core aims are:

- **Professional Mastery:** To provide deep theoretical and practical knowledge of electrical QA/QC at a managerial level.
- **Global Mobility:** To align learners with international standards, facilitating a pathway to **ISO 9001 Lead Auditor** status and advanced NDT certifications.
- **Future-Ready Skills:** To embed sustainability and digital literacy into the quality control process, ensuring graduates are prepared for "Industry 4.0."

Targeted Audience

This qualification is specifically curated for individuals who already possess a technical foundation and are looking to elevate their career trajectory.

- **Aspiring Managers:** QA/QC Engineers and Site Supervisors looking to move into "Quality Lead" or "Quality Manager" positions.
- **Consultants:** Professionals aiming to offer independent electrical QA/QC consultancy services.
- **Compliance Officers:** Individuals responsible for ensuring organizational adherence to international electrical and safety codes.
- **Senior Technicians:** Highly experienced electrical workers seeking a formal, degree-level validation of their expertise to move into office-based leadership.

Certification Framework

Qualification title	ICTQual AB Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical
Course ID	QC0202
Total Qualification Time	600 Hours
Guided Learning Hours	300 Hours
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

To enrol in ICTQual Level 6 Diploma in Quality Assurance and Quality Control (QA/QC) Electrical, learner must meet the following entry requirements:

- ✓ **Age Requirement:** Learners must be at least 18 years old at the time of enrolment. This ensures they have the maturity to engage with both the academic and practical aspects of the programme.
- ✓ **Educational Background:** A Level 5 Diploma, Higher National Diploma (HND), or equivalent qualification in electrical engineering, quality management, or a related field. In some cases, learners with a Level 3 Diploma plus significant industry experience may also be considered.
- ✓ **Professional Experience:** Relevant work experience in electrical engineering, construction, or QA/QC roles is highly recommended. This ensures learners can apply advanced concepts to real world projects.
- ✓ **English Proficiency:** Since the course is delivered in English, learners should have the ability to read, write, and communicate effectively in English.
- ✓ **Additional Requirements:** Learners should have access to a computer or laptop with reliable internet connectivity. Basic IT literacy is expected to complete online modules, submit assignments, and access course resources.

Qualification Structure

This qualification comprises 6 mandatory units, totalling 60 Credits. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units	
Unit Ref#	Unit Title
QC0202-01	Advanced Quality Management Systems in Electrical Engineering
QC0202-02	Electrical Project Planning, Risk, and Compliance Management
QC0202-03	Advanced Inspection, Testing, and Non-Destructive Evaluation (NDE) in Electrical Systems
QC0202-04	Leadership and Strategic Decision-Making in Electrical QA/QC
QC0202-05	Sustainability, Innovation, and Digital Tools in Electrical QA/QC
QC0202-06	Research Project in Electrical Quality Assurance and Control

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 possess a higher degree in electrical engineering or a related technical field and significant professional experience in electrical quality management, while demonstrating comprehensive knowledge of international electrical codes, ISO 9001 standards, and advanced QA/QC methodologies alongside effective leadership in technical education and assessment.
- ✓ **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 electrical quality management & QA/QC methodologies.
- ✓ **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

QC0202-01- Advanced Quality Management Systems in Electrical Engineering

This unit explores Advanced Quality Management Systems (QMS) tailored for the electrical engineering sector. Learners evaluate ISO 9001 implementation, focusing on design, documentation, and auditing processes within technical environments. By analyzing complex quality frameworks, students develop the skills to maintain high-performance standards, drive continuous improvement, and govern organizational quality cultures, ensuring electrical systems meet rigorous international benchmarks and requirements.

Learning Outcome:

Assessment Criteria:

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| 1. Critically evaluate international quality standards (e.g., ISO 9001) and their application in electrical engineering. | 1.1 Critically analyse the core principles of international quality standards (e.g., ISO 9001) used in the electrical engineering sector.
1.2 Evaluate the benefits and limitations of applying these international standards to complex electrical projects.
1.3 Assess current organizational practices against the requirements of international quality standards.
1.4 Propose practical ways to adapt and apply international quality standards in unpredictable electrical engineering environments. |
| 2. Design and implement advanced quality management systems for electrical projects. | 2.1 Formulate a comprehensive plan for an advanced Quality Management System (QMS) tailored to a specific electrical project.
2.2 Design QMS processes that effectively manage complex and interacting factors within electrical engineering.
2.3 Implement customized QMS procedures in a practical, real-world electrical project environment.
2.4 Evaluate the success of the implemented QMS in achieving advanced project quality goals. |
| 3. Analyse the effectiveness of quality assurance frameworks in complex environments. | 3.1 Examine the key features of quality assurance (QA) frameworks applied in complex electrical settings.
3.2 Critically analyse the performance of an existing QA framework against specific electrical project requirements.
3.3 Identify areas of weakness within a QA framework when dealing with unpredictable or interacting project factors. |

- 3.4 Measure the overall effectiveness of QA frameworks using advanced practical and cognitive evaluation methods.
- 4. **Integrate continuous improvement methodologies (e.g., Six Sigma, TQM) into QA/QC processes.**
 - 4.1 Critically compare continuous improvement methodologies (like Six Sigma and TQM) for use in electrical engineering.
 - 4.2 Select the most appropriate improvement methodology to address a complex QA/QC problem.
 - 4.3 Integrate advanced continuous improvement techniques into active electrical QA/QC operations.
 - 4.4 Evaluate how the integration of continuous improvement methods positively changes QA/QC outcomes over time.
- 5. **Assess the impact of quality management on safety, cost, and project performance.**
 - 5.1 Analyze the direct relationship between advanced quality management and electrical safety outcomes.
 - 5.2 Evaluate the financial impact of quality management systems on complex electrical project budgets.
 - 5.3 Measure how practical QA/QC activities affect overall project performance and delivery timelines.
 - 5.4 Formulate strategies to balance high-quality standards with strict safety, cost, and performance constraints.
- 6. **Develop audit procedures and compliance monitoring strategies.**
 - 6.1 Establish the principles of advanced auditing and compliance monitoring for electrical projects.
 - 6.2 Develop comprehensive audit procedures that address complex and varied electrical QA/QC requirements.
 - 6.3 Implement advanced compliance monitoring strategies in unpredictable electrical engineering contexts.
 - 6.4 Adapt existing audit procedures based on the critical analysis of compliance monitoring results.

- 7. Apply advanced documentation and traceability methods in electrical QA/QC.**
 - 7.1 Critically analyse the importance of advanced documentation and traceability in electrical QA/QC.
 - 7.2 Apply complex documentation methods to accurately record QA/QC data in electrical projects.
 - 7.3 Implement robust traceability systems for tracking materials and processes in environments with limited definition.
 - 7.4 Evaluate the effectiveness of current documentation methods in solving complex quality-related problems.

- 8. Recommend improvements to existing quality systems based on performance data.**
 - 8.1 Critically interpret complex performance data gathered from active electrical quality systems.
 - 8.2 Identify the root causes of quality inefficiencies within environments that have many interacting factors.
 - 8.3 Formulate evidence-based recommendations to upgrade and improve existing quality systems.
 - 8.4 Develop a clear action plan to implement these recommendations within an electrical engineering workplace.

QC0202-02- Electrical Project Planning, Risk, and Compliance Management

This unit examines the critical intersection of project planning, risk mitigation, and regulatory compliance in electrical engineering. Learners master sophisticated risk assessment methodologies, such as FMEA, to identify and neutralize technical vulnerabilities. The curriculum emphasizes adherence to international electrical codes and safety legislation, equipping professionals to manage complex compliance requirements throughout the project lifecycle while ensuring operational safety and efficiency.

Learning Outcome:	Assessment Criteria:
1. Apply advanced project planning techniques to electrical QA/QC activities.	1.1 Critically evaluate advanced project planning techniques suitable for complex electrical QA/QC operations. 1.2 Develop a comprehensive project plan that integrates specific QA/QC requirements for an electrical installation. 1.3 Adapt planning methods to address unpredictable factors and resource constraints in live electrical projects. 1.4 Implement advanced planning tools to coordinate and oversee complex, interacting electrical QA/QC activities.
2. Apply advanced project planning techniques to electrical QA/QC activities.	2.1 Critically analyse potential hazards and risks inherent in complex electrical installations and systems. 2.2 Evaluate the probability and potential impact of identified risks using advanced assessment methodologies. 2.3 Investigate interacting factors that could amplify safety or quality risks within unpredictable electrical environments. 2.4 Formulate a comprehensive risk profile for a specific, complex electrical engineering project.
3. Identify and evaluate risks associated with electrical installations and systems.	3.1 Design advanced risk mitigation strategies that directly address identified electrical project risks. 3.2 Ensure proposed mitigation strategies strictly align with current electrical compliance requirements and regulations. 3.3 Implement practical risk control measures effectively within a complex electrical workplace setting.

- 3.4 Evaluate the ongoing effectiveness of applied mitigation strategies in reducing overall risk exposure.
- 4. **Interpret and apply national and international electrical codes and regulations.**
 - 4.1 Critically interpret complex national and international electrical codes relevant to specific QA/QC operations.
 - 4.2 Apply relevant regulatory standards to resolve compliance issues in work contexts with limited definition.
 - 4.3 Evaluate how changes in international electrical codes impact existing QA/QC protocols and procedures.
 - 4.4 Demonstrate occupational competence by ensuring all practical project activities adhere to mandated electrical regulations.
- 5. **Integrate QA/QC processes into project scheduling and resource allocation.**
 - 5.1 Analyze the critical dependencies between quality control processes and overall electrical project schedules.
 - 5.2 Integrate complex QA/QC inspection milestones seamlessly into advanced project timelines.
 - 5.3 Allocate specialized resources and personnel effectively to meet stringent electrical QA/QC requirements.
 - 5.4 Adapt resource allocation and schedules dynamically to address unpredictable delays or quality issues.
- 6. **Monitor compliance with contractual, legal, and regulatory obligations.**
 - 6.1 Establish advanced monitoring systems to track adherence to complex contractual and legal obligations.
 - 6.2 Conduct practical compliance checks during active electrical installation, testing, or commissioning phases.
 - 6.3 Analyze monitoring data to identify trends, root causes, or recurring issues in regulatory adherence.
 - 6.4 Formulate comprehensive compliance reports for stakeholders based on the advanced interpretation of monitoring data.

7. Evaluate the effectiveness of risk management frameworks in electrical projects.

- 7.1 Critically analyse the core components of established risk management frameworks used in electrical engineering.
- 7.2 Measure the success of a specific risk management framework applied to a complex electrical project.
- 7.3 Identify systemic weaknesses in existing risk frameworks when dealing with unpredictable work contexts.
- 7.4 Propose evidence-based modifications to improve the overall effectiveness of electrical risk management frameworks.

8. Recommend corrective actions to address compliance gaps.

- 8.1 Critically investigate the root causes of identified compliance gaps within electrical QA/QC processes.
- 8.2 Develop targeted corrective actions to resolve complex compliance issues that involve many interacting factors.
- 8.3 Implement practical corrective measures to restore compliance in a timely and efficient manner.
- 8.4 Evaluate the long-term impact of corrective actions to ensure specific compliance gaps do not recur.

QC0202-03- Advanced Inspection, Testing, and Non-Destructive Evaluation (NDE) in Electrical Systems

Focusing on high-level technical verification, this unit covers advanced inspection techniques and Non-Destructive Evaluation (NDE) for electrical infrastructure. Students explore thermal imaging, partial discharge analysis, and ultrasonic testing to assess system integrity safely. The unit emphasizes interpreting complex data, mastering calibration protocols, and developing rigorous inspection schedules, ensuring electrical components meet stringent performance criteria and safety standards globally.

Learning Outcome:	Assessment Criteria:
1. Apply advanced inspection and testing methods to electrical systems and components.	1.1 Critically evaluate advanced inspection and testing methodologies appropriate for complex electrical systems. 1.2 Develop comprehensive testing procedures to assess the integrity of electrical components involving multiple interacting factors. 1.3 Execute advanced practical inspection and testing methods on active or simulated electrical installations. 1.4 Adapt testing approaches to troubleshoot electrical problems that have a limited definition.
2. Evaluate the suitability of different NDE techniques for specific electrical applications.	2.1 Critically analyse the underlying principles of various Non-Destructive Evaluation (NDE) techniques used in electrical engineering. 2.2 Evaluate the limitations and advantages of specific NDE methods when applied to complex electrical materials. 2.3 Select the most appropriate NDE technique to detect hidden flaws in high-risk electrical components. 2.4 Justify the choice of NDE methods for specific electrical applications based on advanced technological understanding.
3. Interpret complex test results and identify potential system failures.	3.1 Critically analyse complex data generated from advanced electrical testing and NDE procedures. 3.2 Interpret multifaceted test results to determine the current operational health of an electrical system. 3.3 Identify the root causes of potential system failures by synthesizing interacting testing variables.

- 3.4 Formulate accurate failure predictions using advanced cognitive problem-solving skills and test data.
- 4. Ensure calibration and reliability of advanced testing equipment.**
 - 4.1 Establish rigorous protocols for the calibration and maintenance of advanced electrical testing equipment.
 - 4.2 Evaluate the impact of equipment reliability on the overall accuracy of QA/QC inspection outcomes.
 - 4.3 Implement practical verification checks to ensure testing instruments perform accurately in unpredictable environments.
 - 4.4 Resolve complex equipment calibration issues to maintain the integrity of the electrical testing process.
- 5. Develop inspection protocols for high-risk electrical installations.**
 - 5.1 Critically evaluate the unique safety and quality requirements of high-risk electrical environments.
 - 5.2 Design comprehensive inspection protocols tailored to mitigate risks in complex electrical installations.
 - 5.3 Integrate advanced regulatory and compliance standards into high-risk inspection procedures.
 - 5.4 Adapt existing inspection protocols to address newly identified hazards or unpredictable site conditions.
- 6. Assess the role of NDE in predictive maintenance and reliability engineering.**
 - 6.1 Critically analyse how NDE techniques contribute to the core principles of predictive maintenance.
 - 6.2 Evaluate the effectiveness of NDE in extending the lifecycle and reliability of electrical systems.
 - 6.3 Integrate advanced NDE data into broader reliability engineering strategies for complex projects.
 - 6.4 Formulate predictive maintenance schedules based on the critical interpretation of routine NDE findings.

7. Document inspection findings in line with international QA/QC standards.

- 7.1 Establish advanced documentation systems that comply with international QA/QC electrical standards.
- 7.2 Record complex inspection and NDE findings accurately using structured, professional reporting formats.
- 7.3 Ensure all documented evidence provides clear traceability for quality audits in environments with interacting factors.
- 7.4 Evaluate the effectiveness of current documentation practices in capturing comprehensive inspection data.

8. Recommend corrective and preventive measures based on inspection outcomes.

- 8.1 Critically interpret inspection outcomes to differentiate between isolated defects and systemic electrical issues.
- 8.2 Formulate advanced corrective actions to resolve immediate quality failures in electrical components.
- 8.3 Develop robust preventive measures to eliminate the root causes of identified electrical QA/QC problems.
- 8.4 Implement practical recommendations to continuously improve the quality and safety of the electrical system.

QC0202-04- Leadership and Strategic Decision-Making in Electrical QA/QC

This unit bridges the gap between technical expertise and organizational leadership. Learners develop the strategic decision-making skills required to lead multidisciplinary QA/QC teams and manage diverse stakeholder expectations. Key topics include ethical leadership, conflict resolution, and change management. Students learn to navigate complex professional dilemmas and implement quality-driven strategies that align with broader corporate objectives and global industry trends.

Learning Outcome:	Assessment Criteria:
1. Demonstrate leadership skills in managing QA/QC teams and projects.	1.1 Critically evaluate different leadership theories and their application to managing specialized electrical QA/QC teams. 1.2 Apply advanced leadership techniques to guide a QA/QC team through a complex electrical engineering project. 1.3 Adapt leadership approaches to resolve unpredictable challenges involving multiple interacting project factors. 1.4 Measure the effectiveness of applied leadership skills in achieving specific quality objectives and milestones.
2. Apply strategic decision-making models to complex QA/QC challenges.	2.1 Critically analyse advanced strategic decision-making models relevant to electrical QA/QC contexts. 2.2 Evaluate complex quality challenges that have limited definition to determine the most effective course of action. 2.3 Apply appropriate decision-making frameworks to resolve unpredictable electrical quality and compliance issues. 2.4 Formulate strategic decisions that successfully balance strict technical quality requirements with project constraints.
3. Evaluate the impact of leadership styles on quality culture and performance.	3.1 Critically assess how various leadership styles influence the overall quality culture within an electrical organization. 3.2 Analyze the direct correlation between leadership behaviors and the performance metrics of a QA/QC team. 3.3 Evaluate the effectiveness of current leadership practices in promoting a culture of continuous quality improvement.

- 3.4 Propose practical adjustments to leadership styles to enhance team performance in high-pressure project environments.
- 4. **Develop strategies for conflict resolution and team motivation.**
 - 4.1 Critically evaluate advanced conflict resolution strategies applicable to specialized engineering and technical teams.
 - 4.2 Develop comprehensive strategies to motivate QA/QC personnel working under strict electrical compliance deadlines.
 - 4.3 Apply practical conflict resolution techniques to mediate disputes involving complex, interacting project variables.
 - 4.4 Evaluate the success of implemented motivational strategies in improving QA/QC team retention and output.
- 5. **Integrate ethical considerations into QA/QC leadership decisions.**
 - 5.1 Critically analyse the ethical principles and codes of conduct governing electrical QA/QC practices.
 - 5.2 Evaluate complex scenarios where electrical quality requirements may conflict with project timelines or commercial budgets.
 - 5.3 Integrate advanced ethical considerations into practical decision-making processes for live QA/QC operations.
 - 5.4 Formulate leadership strategies that prioritize uncompromising ethical standards and long-term electrical safety.

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| <p>6. Manage stakeholder expectations in high-pressure project environments.</p> | <p>6.1 Critically analyse the differing priorities and expectations of various stakeholders in a complex electrical project.</p> <p>6.2 Develop advanced communication strategies to effectively manage stakeholder expectations regarding QA/QC outcomes.</p> <p>6.3 Apply practical negotiation skills to align stakeholder demands with realistic and compliant electrical quality standards.</p> <p>6.4 Adapt stakeholder management approaches to mitigate risks in unpredictable, high-pressure project environments.</p> |
| <p>7. Lead quality audits and present findings to senior management.</p> | <p>7.1 Establish advanced procedures for leading comprehensive quality audits in complex electrical workplace settings.</p> <p>7.2 Execute leadership responsibilities during a practical QA/QC audit, managing both personnel and interacting technical factors.</p> <p>7.3 Critically interpret complex audit data to formulate clear, actionable findings regarding electrical quality compliance.</p> <p>7.4 Present strategic audit outcomes to senior management using professional, advanced communication and reporting methods.</p> |
| <p>8. Recommend strategic improvements to enhance organisational QA/QC performance.</p> | <p>8.1 Critically evaluate organizational QA/QC performance data to identify systemic weaknesses and operational gaps.</p> <p>8.2 Formulate advanced, strategic recommendations to improve overall quality management systems in the electrical sector.</p> <p>8.3 Develop a comprehensive implementation plan for proposed strategic improvements, addressing potential interacting factors.</p> <p>8.4 Justify strategic recommendations to organizational leaders based on the critical analysis of complex quality data.</p> |

QC0202-05- Sustainability, Innovation, and Digital Tools in Electrical QA/QC

Exploring the modern landscape of electrical engineering, this unit focuses on integrating digital tools and sustainable practices. Learners examine the impact of Building Information Modelling (BIM), IoT sensors, and AI-driven diagnostics on quality control. The curriculum highlights green energy transitions and environmental compliance, preparing graduates to leverage innovative technologies to optimize electrical system performance while minimizing the ecological footprint.

Learning Outcome:	Assessment Criteria:
1. Evaluate the role of sustainability in electrical QA/QC practices.	1.1 Critically analyse the core principles of sustainability as they apply specifically to complex electrical QA/QC operations. 1.2 Evaluate the environmental and operational impact of current electrical QA/QC practices within a large-scale project. 1.3 Formulate practical methods to seamlessly integrate sustainable practices into established electrical quality control procedures. 1.4 Assess the effectiveness of sustainable QA/QC practices in minimizing waste and improving overall resource efficiency.
2. Integrate green technologies and energy-efficient solutions into QA/QC frameworks.	2.1 Critically evaluate the suitability and compliance of various green technologies for integration into complex electrical systems. 2.2 Design a QA/QC framework that effectively incorporates and monitors specific energy-efficient solutions and technologies. 2.3 Implement practical quality control measures to verify the performance and safety of integrated green technologies. 2.4 Adapt existing QA/QC frameworks to accommodate the unique interacting factors of renewable or energy-efficient installations.
3. Assess the impact of digital tools (e.g., BIM, IoT, AI) on quality management.	3.1 Critically analyse the capabilities and limitations of advanced digital tools (such as BIM, IoT, or AI) in electrical QA/QC. 3.2 Evaluate how the application of digital tools transforms traditional quality management processes in unpredictable environments. 3.3 Measure the practical impact of specific digital tools on the accuracy, speed, and reliability of complex electrical inspections.

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| | 3.4 Justify the selection and use of digital tools to solve electrical quality problems that have a limited definition. |
| 4. Apply data analytics to monitor and improve electrical QA/QC performance. | <ul style="list-style-type: none">4.1 Establish advanced data analytics protocols to monitor multifaceted electrical QA/QC performance metrics.4.2 Critically interpret complex datasets to identify trends, anomalies, and critical areas for quality improvement.4.3 Apply data-driven insights to solve practical, real-world quality control issues within an active electrical project.4.4 Evaluate the ongoing effectiveness of data analytics in continuously improving QA/QC performance and regulatory compliance. |
| 5. Recommend innovative solutions to enhance compliance and efficiency. | <ul style="list-style-type: none">5.1 Critically investigate systemic inefficiencies and compliance bottlenecks within current electrical QA/QC operations.5.2 Formulate innovative, advanced solutions to address complex compliance challenges involving many interacting factors.5.3 Develop a clear implementation strategy for introducing innovative QA/QC practices into a live electrical workplace.5.4 Propose evidence-based recommendations to stakeholders, demonstrating how innovative solutions will enhance overall operational efficiency. |
| 6. Critically analyse case studies of sustainable electrical projects. | <ul style="list-style-type: none">6.1 Critically deconstruct complex case studies of sustainable electrical projects to identify key QA/QC success factors.6.2 Evaluate the methodologies used in past projects to overcome unpredictable sustainability and quality challenges.6.3 Synthesize lessons learned from comprehensive case studies to inform strategic decision-making in current electrical contexts.6.4 Apply advanced insights gained from case study analysis to improve the QA/QC planning of a future sustainable installation. |

7. Develop strategies for adopting emerging technologies in QA/QC.

- 7.1 Critically assess the readiness of an electrical organization or project to adopt specific emerging QA/QC technologies.
- 7.2 Develop a comprehensive, strategic plan for the phased adoption of new technological tools in quality management.
- 7.3 Formulate practical strategies to train personnel and manage the transition to advanced technological QA/QC methods.
- 7.4 Evaluate the potential risks and interacting factors associated with integrating emerging technologies into live electrical projects.

8. Balance sustainability goals with cost and performance requirements.

- 8.1 Critically analyse the complex interactions between sustainability targets, project budgets, and electrical performance standards.
- 8.2 Evaluate practical scenarios where strict environmental goals conflict with commercial cost or technical performance requirements.
- 8.3 Formulate advanced strategies to achieve sustainable QA/QC outcomes without compromising electrical safety or financial viability.
- 8.4 Justify strategic project decisions that successfully balance long-term sustainability with immediate, unpredictable performance constraints.

QC0202-06- Research Project in Electrical Quality Assurance and Control

This capstone unit requires learners to conduct an independent, high-level research project on a contemporary issue within electrical QA/QC. Students demonstrate mastery of research methodologies, data collection, and critical analysis. The project culminates in a technical report proposing evidence-based solutions to real-world engineering challenges, showcasing the learner's ability to contribute original, strategic insights to the professional engineering community.

Learning Outcome:

Assessment Criteria:

1. Formulate a research question relevant to electrical QA/QC.

- 1.1 Critically evaluate current industry trends to identify potential areas for advanced QA/QC research.
- 1.2 Formulate a clear, complex research question that addresses a significant problem in electrical quality management.
- 1.3 Justify the relevance and feasibility of the proposed research question within the context of electrical engineering.
- 1.4 Define the scope and specific objectives required to successfully answer the formulated QA/QC research question.

2. Conduct a literature review to identify gaps in current knowledge.

- 2.1 Critically analyze a wide range of academic and industry literature relevant to the chosen electrical QA/QC topic.
- 2.2 Synthesize complex information from various sources to establish the current state of knowledge in the field.
- 2.3 Identify clear gaps, inconsistencies, or unresolved issues within existing electrical quality management research.
- 2.4 Evaluate how the proposed research project will address the identified gaps in current QA/QC knowledge.

3. Apply appropriate research methodologies to investigate QA/QC issues.

- 3.1 Critically compare different research methodologies and their suitability for investigating complex electrical QA/QC problems.
- 3.2 Select and justify the most appropriate research methods (qualitative, quantitative, or mixed) for the specific project.
- 3.3 Design a robust research framework that accounts for interacting variables and unpredictable factors in the electrical sector.

- 3.4 Apply the chosen methodologies practically to conduct ethical and valid investigations into QA/QC issues.
- 4. **Collect, analyse, and interpret data from electrical engineering contexts.**
 - 4.1 Implement systematic procedures to collect accurate data from complex electrical engineering environments.
 - 4.2 Apply advanced analytical techniques to process and organize raw data gathered during QA/QC research.
 - 4.3 Critically interpret complex datasets to identify significant patterns, correlations, or anomalies in electrical quality.
 - 4.4 Evaluate the reliability and validity of the collected data within the context of the defined research limitations.
- 5. **Evaluate findings against industry standards and best practices.**
 - 5.1 Critically compare primary research findings against established national and international electrical quality standards.
 - 5.2 Analyze how the research outcomes align with or challenge current industry best practices in QA/QC.
 - 5.3 Evaluate the practical implications of the findings for resolving complex quality control issues in the workplace.
 - 5.4 Formulate objective conclusions based on the rigorous evaluation of research data against industry benchmarks.
- 6. **Present research outcomes in a professional, structured format.**
 - 6.1 Structure a comprehensive research report that logically presents complex QA/QC investigations and findings.
 - 6.2 Utilize advanced academic and technical writing skills to articulate research outcomes clearly to industry stakeholders.
 - 6.3 Design professional visual aids to effectively communicate complex electrical data and research metrics.
 - 6.4 Defend research methodologies, findings, and conclusions during a formal presentation or review process.

7. Recommend practical applications of research findings to industry.

- 7.1 Translate complex research conclusions into actionable, practical recommendations for the electrical engineering sector.
- 7.2 Develop a strategic implementation plan to apply research findings to existing QA/QC systems and processes.
- 7.3 Evaluate the potential technical and financial impact of adopting the proposed recommendations in a live project.
- 7.4 Justify how the recommended applications will solve problems that have a limited definition and involve many interacting factors.

8. Reflect on personal learning and professional development through research.

- 8.1 Critically reflect on the advanced cognitive and practical skills developed during the QA/QC research project.
- 8.2 Evaluate personal performance in managing complex research tasks, unpredictable challenges, and time constraints.
- 8.3 Identify specific areas where the research process has enhanced occupational competence in electrical quality management.
- 8.4 Formulate a continuous professional development plan based on the self-assessment of the research experience.

ICTQual AB

Yew Tree Avenue, Dagenham,

London East, United Kingdom RM10 7FN

+447441398083

support@ictqualab.co.uk | www.ictqualab.co.uk

Visit Official Webpage

