ICTQual AB

Qualification Specification

Level 6 Diploma in Electrical Engineering
360 Credits – Three Years

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Qualification Specifications about

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About ICTQual AB

ICTQual AB UK Ltd. 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 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.

The organization prides itself on delivering high-quality educational solutions through a network of Approved Training Centres worldwide. Their robust curriculum and innovative teaching methodologies are designed to 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 continuously evolves its programs to stay ahead of industry trends and technological advancements.

ICTQual AB's vision is to set benchmarks for educational excellence while promoting inclusivity and integrity. Their unwavering focus on quality and accessibility makes them a trusted partner in shaping future-ready professionals and advancing societal progress globally.

Course Overview

The ICTQual Level 6 Diploma in Electrical Engineering is a comprehensive three-year program designed to equip students with advanced knowledge and practical skills essential for a successful career in electrical engineering. The curriculum encompasses a broad spectrum of topics, including electrical systems design, power generation, circuit analysis, and automation, ensuring a well-rounded understanding of both theoretical principles and hands-on applications. This structured approach prepares graduates to address real-world challenges and contribute to innovative solutions within the electrical engineering sector.

Ideal for aspiring engineers aiming to specialize in fields such as energy, construction, manufacturing, or telecommunications, this diploma offers a robust foundation in core engineering principles while allowing for specialization aligned with individual career goals. The program emphasizes problem-solving, project management, and technical proficiency, ensuring that graduates are well-prepared to lead in various engineering roles. With a flexible learning approach that combines classroom instruction, practical workshops, and project-based assessments, students gain ample opportunities to apply their knowledge in real-life scenarios, fostering critical thinking and enhancing technical abilities. Upon completion, graduates possess the expertise and confidence to manage complex engineering projects, making this qualification a valuable asset for those seeking to advance in the dynamic field of electrical engineering.

Certification Framework

Qualification title	**ICTQual Level 6 Diploma in Electrical Engineering 360 Credits – Three Years**
Course ID	EE0001
Qualification Credits	360 Credits
Course Duration	Three Years
Grading Type	Pass / Fail
Competency Evaluation	Coursework / Assignments / Verifiable Experience
Assessment	The assessment and verification process for ICTQual qualifications involves two key stages: **Internal Assessment and Verification:** ✓ Conducted by the staff at the Approved Training Centre (ATC). Ensures 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 processes. **External Quality Assurance:** ✓ Managed by ICTQual AB 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 the ICTQual Level 6 Diploma in Electrical Engineering 360 Credits – Three Years, candidates must meet the following entry requirements:

- ✓ Applicants must be at least 16 years old.
- ✓ A minimum of a Level 5 qualification (or equivalent) in a related field such as electrical engineering, electronics, or applied sciences. Alternatively, applicants with A-levels or equivalent qualifications in Mathematics, Physics, or other relevant subjects may also be considered.
- ✓ Previous foundational knowledge in engineering or electrical concepts is recommended, though some programs may offer preparatory courses for those without formal experience.
- ✓ For non-native English speakers, proof of English language proficiency is required to ensure students can successfully complete the course.

Qualification Structure

This qualification comprises 36 mandatory units, totalling 360 credits. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units		
Unit Ref#	**Unit Title**	**Credits**
Year 1 (120 Credits)		
EE0001 - 1	Engineering Mathematics I	10

EE0001 - 2	Fundamentals of Electrical Circuits	10
EE0001 - 3	Principles of Electronics	10
EE0001 - 4	Digital Logic Design	10
EE0001 - 5	Electrical Machines and Transformers	10
EE0001 - 6	Introduction to Control Systems	10
EE0001 - 7	Engineering Drawing and CAD	10
EE0001 - 8	Introduction to Microprocessors and Microcontrollers	10
EE0001 - 9	Electrical Measurement and Instrumentation	10
EE0001 - 10	Physics for Engineers	10
EE0001 - 11	Health and Safety in Engineering	10
EE0001 - 12	Sustainability in Electrical Engineering	10
Year 2 (120 Credits)		
EE0001 - 13	Engineering Mathematics II	10
EE0001 - 14	Power Systems Analysis	10
EE0001 - 15	Analogue Electronics	10
EE0001 - 16	Embedded Systems and Applications	10
EE0001 - 17	Electrical Energy Systems	10
EE0001 - 18	Signals and Systems	10
EE0001 - 19	Principles of Automation and Robotics	10
EE0001 - 20	Industrial Electronics	10
EE0001 - 21	Communication Systems Engineering	10
EE0001 - 22	Renewable Energy Technologies	10
EE0001 - 23	Electrical Project Management	10
EE0001 - 24	Technical Report Writing and Research Methods	10
Year 3 (120 Credits)		
EE0001 - 25	Advanced Power Electronics	10
EE0001 - 26	Smart Grid Technology	10
EE0001 - 27	Electrical Machine Design	10
EE0001 - 28	Advanced Control Systems	10
EE0001 - 29	High Voltage Engineering	10
EE0001 - 30	Instrumentation and Process Control	10
EE0001 - 31	Advanced Embedded Systems	10
EE0001 - 32	Energy Storage and Conversion Systems	10
EE0001 - 33	Wireless and Optical Communication	10
EE0001 - 34	Electromagnetic Compatibility	10
EE0001 - 35	Capstone Project	10
EE0001 - 36	Professional Development and Ethical Practices	10

Centre Requirements

Even if a centre is already registered with ICTQual AB, it must meet specific requirements to deliver the ICTQual Level 6 Diploma in Electrical Engineering 360 Credits – Three Years. These standards ensure the quality and consistency of training, assessment, and learner support.

1. Approval to Deliver the Qualification

- ✓ Centres must obtain formal approval from ICTQual AB to deliver this specific qualification, even if they are already registered.
- ✓ The approval process includes a review of resources, staff qualifications, and policies relevant to the program.

2. Qualified Staff

- ✓ **Tutors:** Must have relevant qualifications in electrical engineering or construction at Level 7 or higher, alongside teaching/training experience.
- ✓ **Assessors:** Must hold a recognized assessor qualification and demonstrate expertise in civil engineering
- ✓ **Internal Quality Assurers (IQAs):** Must be appropriately qualified and experienced to monitor the quality of assessments.

3. Learning Facilities

Centres must have access to appropriate learning facilities, which include:

- ✓ **Classrooms:** Modern classrooms equipped with multimedia tools to deliver engaging theoretical instruction on structural design, construction methods, and sustainable engineering practices.
- ✓ **Practical Areas**: Hands-on training areas with advanced equipment for material testing, surveying instruments, concrete mixing, and structural analysis, providing practical experience in real-world civil engineering applications.
- ✓ **Technology Access:** High-performance computers with industry-standard software (e.g., AutoCAD, STAAD.Pro, Revit, and GIS tools) and reliable internet connectivity for drafting, modelling, and project management tasks.

4. Health and Safety Compliance

- ✓ Centres must ensure that practical training environments comply with relevant health and safety regulations.
- ✓ Risk assessments must be conducted regularly to maintain a safe learning environment.

5. Resource Requirements

- ✓ Learning Materials: Approved course manuals, textbooks, and study guides aligned with the curriculum.
- ✓ Assessment Tools: Templates, guidelines, and resources for conducting and recording assessments.
- ✓ E-Learning Systems: If offering online or hybrid learning, centres must provide a robust Learning Management System (LMS) to facilitate remote delivery.

6. Assessment and Quality Assurance

- ✓ Centres must adhere to ICTQual's assessment standards, ensuring that all assessments are fair, valid, and reliable.
- ✓ Internal quality assurance (IQA) processes must be in place to monitor assessments and provide feedback to assessors.
- ✓ External verification visits from ICTQual will ensure compliance with awarding body standards.

7. Learner Support

- ✓ Centres must provide learners with access to guidance and support throughout the program, including:
- ✓ Academic support for coursework.
- ✓ Career guidance for future progression.
- ✓ Additional support for learners with specific needs (e.g., disabilities or language barriers).

8. Policies and Procedures

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

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

9. Regular Reporting to ICTQual

- ✓ Centres must provide regular updates to ICTQual AB on learner enrolment, progress, and completion rates.
- ✓ Centres are required to maintain records of assessments and learner achievements for external auditing purposes.

Support for Candidates

Centres should ensure that materials developed to support candidates:

- ✓ Facilitate tracking of achievements as candidates progress through the learning outcomes and assessment criteria.
- ✓ Include information on how and where ICTQual'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

EE0001 -1: Engineering Mathematics I

The aim of this study unit is to equip students with the essential mathematical skills required to approach and solve complex engineering problems. By focusing on key mathematical concepts, including calculus, algebra, and trigonometry, students will gain a solid foundation for applying these principles to practical engineering contexts. The unit will also emphasize the use of mathematical tools for the modelling and analysis of basic electrical and electronic systems, enabling students to develop problem-solving strategies in real-world engineering scenarios.

Learning Outcome:	Assessment Criteria:
1. Apply fundamental mathematical concepts such as calculus, algebra, and trigonometry to solve engineering problems.	1.1. Demonstrates a comprehensive understanding of fundamental mathematical concepts, including calculus, algebra, and trigonometry, relevant to engineering contexts. 1.2. Applies mathematical techniques accurately to solve engineering problems, ensuring appropriate methods are used for each scenario. 1.3. Integrates complex mathematical principles to analyse and solve multi-step engineering challenges. 1.4. Presents mathematical solutions clearly, with logical steps and correct notation, in a professional engineering context. 1.5. Effectively interprets engineering problems, selecting the most suitable mathematical approach to obtain precise and reliable results. 1.6. Critically evaluates the results of mathematical calculations, identifying potential errors and refining solutions as necessary.
2. Utilize mathematical tools to model and analyse simple electrical and electronic systems.	2.1. Demonstrates proficiency in selecting and applying appropriate mathematical tools to model electrical and electronic systems. 2.2. Accurately models simple electrical and electronic systems using mathematical techniques, ensuring correct representation of system variables. 2.3. Utilises mathematical analysis to predict system behaviour under various conditions, ensuring results align with theoretical principles. 2.4. Effectively interprets the outcomes of

	mathematical models to assess the performance and functionality of electrical and electronic systems. 2.5. Identifies and addresses any limitations or assumptions inherent in the mathematical models used for system analysis. 2.6. Presents the mathematical modelling and analysis process in a clear, structured manner, highlighting key findings and implications for system design.

EE0001 -2: Fundamentals of Electrical Circuits

The aim of this study unit is to provide students with a comprehensive understanding of the fundamental principles governing electrical circuits. By exploring key laws and theorems such as Ohm's Law and Kirchhoff's Laws, students will develop the analytical skills required to analyse and solve electrical circuit problems. The unit also focuses on the design and simulation of basic electrical circuits, preparing students to apply theoretical knowledge to practical engineering applications.

Learning Outcome:	Assessment Criteria:
1. Analyse electrical circuits using basic laws and theorems, such as Ohm's Law and Kirchhoff's Laws.	1.1. Demonstrates a thorough understanding of basic electrical laws and theorems, including Ohm's Law and Kirchhoff's Laws, and applies them accurately. 1.2. Correctly identifies and applies Ohm's Law and Kirchhoff's Laws to analyse simple electrical circuits. 1.3. Uses systematic methods to solve for unknown quantities in electrical circuits, ensuring correct application of circuit laws. 1.4. Evaluates circuit behaviour by interpreting and manipulating equations derived from Ohm's and Kirchhoff's Laws. 1.5. Identifies and addresses potential inconsistencies or errors in circuit analysis, ensuring valid results. 1.6. Communicates the analysis process clearly, presenting solutions and justifications in a professional and concise manner.
2. Design and simulate basic electrical circuits for practical applications.	2.1. Demonstrates a clear understanding of the principles behind electrical circuit design and simulation for practical applications. 2.2. Effectively selects and utilises appropriate components and configurations to design functional electrical circuits. 2.3. Utilises simulation software accurately to model and test the behaviour of designed circuits under various conditions. 2.4. Analyses simulation results critically, adjusting circuit parameters to optimise performance for specific applications. 2.5. Identifies potential issues in circuit design through simulation and proposes suitable modifications or improvements. 2.6. Presents circuit designs and simulation outcomes in a structured and professional manner, ensuring clarity and technical accuracy.

EE0001 -3: Principles of Electronics

The aim of this study unit is to provide students with a fundamental understanding of the operation and application of basic electronic components such as diodes, transistors, and other essential devices. By exploring the underlying principles of electronics, students will gain the knowledge required to design and analyse simple amplifiers, rectifiers, and other basic electronic circuits. This unit emphasizes the practical application of electronics in real-world systems, equipping students with the skills necessary for future innovation and development in the field of electronics.

Learning Outcome:	Assessment Criteria:
1. Understand the operation of basic electronic components such as diodes and transistors.	1.1. Demonstrates a comprehensive understanding of the fundamental principles behind the operation of diodes and transistors. 1.2. Explains the functionality and characteristics of diodes and transistors in electronic circuits, identifying key parameters and behaviours. 1.3. Correctly identifies different types of diodes and transistors and their specific applications in electronic systems. 1.4. Analyses the role of diodes and transistors in circuit operation, explaining their impact on current flow and voltage regulation. 1.5. Recognises and addresses issues related to the operation of diodes and transistors in real-world circuits. 1.6. Communicates the understanding of diodes and transistors effectively, presenting technical concepts in a clear and professional manner.
2. Apply principles of electronics to design simple amplifiers and rectifiers.	2.1. Demonstrates a thorough understanding of the principles of electronics relevant to amplifier and rectifier design. 2.2. Effectively applies electronic concepts to design basic amplifier and rectifier circuits, selecting appropriate components and configurations. 2.3. Analyses and calculates key parameters such as gain, efficiency, and frequency response for amplifier and rectifier designs. 2.4. Identifies and addresses potential issues in circuit performance, making adjustments to optimise functionality.

	2.5. Evaluates the practical application of designed circuits, ensuring they meet specified requirements for real-world use. 2.6. Communicates design processes and outcomes clearly, providing technical explanations and justifications for design decisions.

EE0001 -4 Digital Logic Design

The aim of this study unit is to introduce students to the principles and techniques of digital logic design. By exploring both combinational and sequential logic design, students will develop the skills required to construct and analyse digital circuits. The unit emphasizes the use of truth tables and Karnaugh maps for simplifying and optimizing digital circuits, providing students with the foundational knowledge necessary for creating efficient digital systems used in a wide range of electronic applications.

Learning Outcome:	Assessment Criteria:
1. Develop logic circuits using combinational and sequential design techniques.	1.1. Demonstrates a strong understanding of combinational and sequential logic design techniques. 1.2. Accurately develops logic circuits using the appropriate design methods for combinational and sequential systems. 1.3. Utilises Boolean algebra and truth tables to design and optimise combinational logic circuits. 1.4. Applies flip-flops, registers, and counters effectively in the design of sequential logic circuits. 1.5. Analyses and verifies the functionality of developed circuits, ensuring correct operation under different conditions. 1.6. Communicates the design process and circuit behaviour clearly, using professional terminology and diagrams to support explanations.
2. Use truth tables and Karnaugh maps to simplify and optimize digital circuits.	2.1. Demonstrates a thorough understanding of truth tables and Karnaugh maps for simplifying and optimising digital circuits. 2.2. Accurately constructs truth tables to represent digital circuit behaviours, ensuring all possible input combinations are covered. 2.3. Utilises Karnaugh maps to simplify Boolean expressions, reducing the complexity of digital circuit designs. 2.4. Identifies and applies optimisation techniques to improve the efficiency and performance of digital circuits. 2.5. Verifies the correctness of simplified circuits through logical analysis and testing, ensuring expected outputs are achieved. 2.6. Communicates the simplification process clearly, presenting the use of truth tables and Karnaugh maps in a structured and professional manner.

EE0001 -5: Electrical Machines and Transformers

The aim of this study unit is to provide students with a comprehensive understanding of the fundamental principles and operational characteristics of electrical machines and transformers. Students will explore the working mechanisms of machines such as motors, generators, and transformers, with a focus on their construction, working principles, and applications.

Learning Outcome:	Assessment Criteria:
1. Explain the working principles of electrical machines and transformers.	1.1. Demonstrates a clear understanding of the fundamental principles governing the operation of electrical machines and transformers. 1.2. Explains the construction, working principles, and operation of different types of electrical machines, such as motors and generators. 1.3. Describes the key concepts of electromagnetic induction, magnetic fields, and energy conversion in electrical machines and transformers. 1.4. Analyses the functioning of transformers, including voltage transformation and efficiency considerations. 1.5. Identifies common faults and issues in electrical machines and transformers, explaining their causes and effects on performance. 1.6. Communicates the working principles of electrical machines and transformers effectively, using appropriate technical terminology and diagrams.
2. Perform calculations to determine the performance parameters of these devices.	2.1. Accurately performs calculations to determine key performance parameters of electrical machines and transformers, including efficiency, power factor, and voltage regulation. 2.2. Utilises appropriate formulas and methods to calculate operating conditions such as input/output power, current, and torque. 2.3. Demonstrates the ability to apply relevant mathematical techniques to determine the performance of different types of electrical machines and transformers.

	2.4. Analyses and interprets calculation results to assess the performance and suitability of devices for specific applications. 2.5. Identifies and addresses potential errors or inconsistencies in calculations, ensuring accurate and reliable outcomes. 2.6. Communicates calculation processes and results clearly, presenting findings in a structured and professional manner.

EE0001 -6: Introduction to Control Systems

The aim of this study unit is to introduce students to the fundamental principles of control systems, including the concepts of feedback, stability, and system dynamics. Students will explore various control strategies, with a particular focus on Proportional, Integral, and Derivative (PID) controllers. The unit will enable students to design and analyse simple control systems, equipping them with the foundational knowledge needed to understand and implement control techniques in engineering applications.

Learning Outcome:	Assessment Criteria:
1. Understand the fundamental concepts of control systems, including feedback and stability.	1.1. Demonstrates a comprehensive understanding of the fundamental concepts of control systems, including feedback mechanisms and stability criteria. 1.2. Explains the role of feedback in control systems and its impact on system performance and stability. 1.3. Identifies and describes different types of feedback, such as negative and positive feedback, and their effects on system behaviour. 1.4. Understands and applies the concept of stability in control systems, including methods to assess and improve stability. 1.5. Analyses the dynamic response of control systems, considering the influence of feedback and stability on system performance. 1.6. Communicates control system concepts clearly, using appropriate technical terminology and diagrams to support explanations.
2. Design simple control systems using proportional, integral, and derivative (PID) controllers.	2.1. Demonstrates a clear understanding of the principles behind proportional, integral, and derivative (PID) controllers in control system design. 2.2. Applies the appropriate PID control techniques to design simple control systems, ensuring the desired system response is achieved. 2.3. Determines suitable PID gains based on system requirements, optimising the control performance for accuracy and stability. 2.4. Analyses the impact of each PID component (P, I, D) on system performance, adjusting the controller parameters to achieve the best balance between responsiveness and stability. 2.5. Evaluates the designed control systems

	through simulation or calculation, ensuring the system meets performance criteria under various conditions. 2.6. Communicates the design process and results clearly, providing justifications for PID parameter choices and explaining the system's behaviour.

EE0001 -7: Engineering Drawing and CAD

The aim of this study unit is to equip students with the skills to create precise engineering drawings using both traditional methods and modern Computer-Aided Design (CAD) tools. Students will learn to interpret and produce technical drawings for electrical and electronic components, ensuring they meet industry standards for clarity, accuracy, and functionality. This unit emphasizes the integration of drawing techniques with the design and documentation of electrical and electronic systems, preparing students for real-world engineering applications.

Learning Outcome:	Assessment Criteria:
1. Create accurate engineering drawings using traditional and computer-aided design (CAD) tools.	1.1. Demonstrates proficiency in creating accurate engineering drawings using both traditional and computer-aided design (CAD) tools. 1.2. Utilises standard drawing conventions and symbols to produce clear, professional engineering diagrams. 1.3. Applies CAD software tools effectively, creating detailed 2D and 3D drawings that meet engineering specifications. 1.4. Ensures dimensional accuracy and proper scaling in all engineering drawings, adhering to relevant industry standards. 1.5. Incorporates necessary details such as tolerances, material specifications, and assembly instructions in engineering drawings. 1.6. Communicates design intent clearly through well-organised and annotated drawings, ensuring they are easily interpretable by other professionals.
2. Interpret and produce technical drawings for electrical and electronic components.	2.1. Demonstrates a strong understanding of the symbols, conventions, and standards used in technical drawings for electrical and electronic components. 2.2. Accurately interprets technical drawings, identifying key components, connections, and operational details. 2.3. Produces detailed technical drawings for electrical and electronic components, ensuring correct representation of component specifications and connections. 2.4. Utilises appropriate software or manual methods to create technical drawings that

	meet industry standards and project requirements. 2.5. Incorporates necessary details such as component ratings, part numbers, and connection diagrams in technical drawings. 2.6. Communicates technical drawing specifications clearly, ensuring they are precise and understandable for use in manufacturing or assembly.

EE0001 -8: Introduction to Microprocessors and Microcontrollers

The aim of this study unit is to provide students with a comprehensive understanding of the architecture and operation of microprocessors and microcontrollers. Students will learn how these devices function, how to interact with hardware, and how to program microcontrollers for a variety of practical applications. The unit will also cover the design and implementation of basic programs that control hardware systems, enabling students to apply their knowledge to real-world embedded systems.

Learning Outcome:	Assessment Criteria:
1. Understand the architecture and operation of microprocessors and microcontrollers.	1.1. Demonstrates a comprehensive understanding of the architecture and fundamental components of microprocessors and microcontrollers. 1.2. Explains the role and function of key microprocessor/microcontroller components, including the central processing unit (CPU), memory, and input/output interfaces. 1.3. Describes the operation of microprocessors and microcontrollers, including data processing, control flow, and communication with external devices. 1.4. Identifies different types of microprocessors and microcontrollers, understanding their applications in various systems. 1.5. Analyses the interaction between software and hardware in microprocessor/microcontroller systems, including instruction sets and peripheral control. 1.6. Communicates the principles of microprocessor and microcontroller architecture clearly, using appropriate technical terminology and diagrams.
2. Develop basic programs to control hardware systems using microcontrollers	2.1. Demonstrates the ability to write basic programs for microcontrollers, using appropriate programming languages such as C or assembly. 2.2. Effectively interfaces microcontrollers with hardware components, including sensors, actuators, and other peripheral devices. 2.3. Develops programs that accurately control hardware systems, ensuring correct input/output operations and system responses.

	2.4. Utilises interrupts, timers, and other microcontroller features to optimise program performance and control flow. 2.5. Troubleshoots and debugs programs to ensure reliable operation and functionality of hardware systems. 2.6. Communicates the development process clearly, documenting code and design decisions for future reference or collaboration.

EE0001 -9: Electrical Measurement and Instrumentation

The aim of this study unit is to provide students with a comprehensive understanding of the principles and techniques involved in electrical measurement and instrumentation. Students will learn to use various measurement tools and instruments to quantify essential electrical parameters, such as voltage, current, and resistance. The unit also emphasizes evaluating the accuracy, precision, and reliability of electrical measurement systems, ensuring that students can confidently select and apply measurement instruments in practical electrical engineering contexts.

Learning Outcome:	Assessment Criteria:
1. Use measurement tools and instruments to quantify electrical parameters like voltage, current, and resistance.	1.1. Demonstrates proficiency in using measurement tools such as multimeters, oscilloscopes, and power meters to quantify electrical parameters. 1.2. Accurately measures voltage, current, and resistance, ensuring correct tool settings and proper connections during the process. 1.3. Understands the principles and limitations of various measurement instruments, selecting the appropriate tool for specific electrical parameters. 1.4. Interprets measurement results clearly, ensuring accuracy and reliability in the reported values. 1.5. Identifies and resolves any issues with measurements, such as instrument calibration or connection errors, to ensure valid results. 1.6. Communicates measurement procedures and results effectively, presenting data in a clear, professional manner.
2. Evaluate the accuracy and reliability of electrical measurement systems.	2.1. Demonstrates a comprehensive understanding of factors that affect the accuracy and reliability of electrical measurement systems, including calibration, resolution, and environmental influences. 2.2. Applies appropriate methods to assess the accuracy of measurement instruments, ensuring they meet required standards and specifications. 2.3. Identifies sources of measurement error and implements techniques to minimise inaccuracies in electrical measurements. 2.4. Evaluates the reliability of measurement systems by conducting repeatability and consistency tests under various conditions. 2.5. Interprets measurement uncertainties and

	reports results with the necessary confidence intervals or error margins. 2.6. Communicates the evaluation process and findings clearly, providing justifications for the accuracy and reliability of the measurement system used.

EE0001 -10: Physics for Engineers

The aim of this study unit is to provide students with a solid foundation in fundamental physics principles, focusing on key areas such as electromagnetism and mechanics, and their application to engineering scenarios. The unit is designed to enable students to solve engineering problems related to energy, force, and motion, particularly in the context of electrical systems. Students will learn how to apply these physics concepts to analyse and design systems, optimizing their performance and efficiency in real-world engineering applications.

Learning Outcome:	Assessment Criteria:
1. Apply fundamental physics concepts, such as electromagnetism and mechanics, to engineering scenarios.	1.1. Demonstrates a solid understanding of fundamental physics concepts, including electromagnetism and mechanics, and their relevance to engineering applications. 1.2. Accurately applies the principles of electromagnetism to solve engineering problems, such as analysing circuits, magnetic fields, and electric motors. 1.3. Utilises mechanical principles to analyse and solve engineering challenges related to forces, motion, and energy transfer. 1.4. Integrates electromagnetism and mechanics to design and optimise systems, ensuring efficient and effective solutions for engineering problems. 1.5. Identifies and addresses potential issues in applying physics concepts, ensuring correct assumptions and calculations are used. 1.6. Communicates the application of physics concepts clearly, presenting solutions and technical reasoning in a professional manner.
2. Solve problems involving energy, force, and motion in electrical systems.	2.1. Demonstrates a clear understanding of the fundamental principles of energy, force, and motion in electrical systems, applying them to solve complex problems. 2.2. Accurately calculates energy consumption, force, and motion parameters in electrical systems, using appropriate formulas and methods. 2.3. Analyses the impact of energy, force, and motion on the performance of electrical systems, considering factors like efficiency and system dynamics. 2.4. Identifies key variables affecting energy, force, and motion in electrical circuits and systems, addressing them in problem-solving approaches.

	2.5. Applies advanced techniques to optimise electrical system performance by manipulating energy, force, and motion parameters. 2.6. Communicates problem-solving approaches and solutions effectively, ensuring clarity in calculations and justifications.

EE0001 -11 Health and Safety in Engineering

The aim of this study unit is to provide students with a thorough understanding of health and safety principles in engineering environments. Students will learn to identify potential hazards, assess risks, and implement appropriate safety measures to protect themselves, colleagues, and the environment. The unit emphasizes the importance of adhering to health and safety regulations and standards in engineering practice, ensuring safe and efficient operation across all engineering disciplines.

Learning Outcome:	Assessment Criteria:
1. Identify potential hazards in engineering environments and implement appropriate safety measures.	1.1. Demonstrates a comprehensive understanding of common hazards in engineering environments, including electrical, mechanical, and chemical risks. 1.2. Identifies potential safety hazards in various engineering settings through risk assessments and hazard analysis techniques. 1.3. Implements appropriate safety measures, such as personal protective equipment (PPE), safety protocols, and emergency procedures, to mitigate identified risks. 1.4. Applies industry safety standards and regulations to ensure a safe working environment and compliance with health and safety laws. 1.5. Monitors and evaluates the effectiveness of safety measures, making adjustments as necessary to improve workplace safety. 1.6. Communicates safety procedures and hazard identification strategies clearly, ensuring all personnel are aware of risks and safety protocols.
2. Understand and comply with health and safety regulations in engineering practice.	2.1. Demonstrates a thorough understanding of relevant health and safety regulations and standards in engineering practice. 2.2. Applies health and safety regulations consistently in daily engineering tasks, ensuring compliance with legal and organisational requirements. 2.3. Identifies and addresses potential risks in engineering activities, taking appropriate actions to minimise hazards and ensure safety. 2.4. Maintains up-to-date knowledge of changes in health and safety legislation, adapting practices accordingly to ensure continued compliance. 2.5. Promotes a culture of safety within the

	workplace, encouraging colleagues to adhere to health and safety protocols. 2.6. Communicates health and safety requirements clearly, ensuring all team members understand their responsibilities and the importance of safety in engineering practice.

EE0001 -12 Sustainability in Electrical Engineering

The aim of this study unit is to equip students with the knowledge and skills to evaluate the environmental impact of electrical engineering solutions and processes. The unit emphasizes the importance of sustainability in engineering, focusing on the integration of energy-efficient designs, renewable energy sources, and environmentally responsible practices in electrical engineering projects. Students will learn how to develop solutions that minimize negative environmental effects while optimizing performance, efficiency, and resource utilization.

Learning Outcome:	Assessment Criteria:
1. Evaluate the environmental impact of electrical engineering solutions and processes.	1.1. Demonstrates a thorough understanding of the environmental implications of electrical engineering solutions, including resource usage, waste, and emissions. 1.2. Evaluates the environmental impact of electrical systems and processes, considering factors such as energy consumption, material sourcing, and sustainability. 1.3. Identifies opportunities to minimise environmental harm through the use of energy-efficient technologies, recycling, and eco-friendly materials. 1.4. Applies life cycle analysis techniques to assess the long-term environmental effects of electrical engineering projects. 1.5. Develops strategies to reduce the environmental footprint of electrical engineering solutions, ensuring compliance with environmental regulations. 1.6. Communicates environmental impact assessments clearly, providing actionable recommendations to stakeholders for sustainable practices.
2. Incorporate sustainable practices and energy-efficient designs into engineering projects.	2.1. Demonstrates a clear understanding of sustainable engineering principles and integrates them into design processes to reduce environmental impact. 2.2. Incorporates energy-efficient technologies and materials into engineering projects, ensuring optimal use of resources and minimal waste. 2.3. Applies life cycle analysis and sustainability criteria to assess the environmental performance of engineering designs and solutions. 2.4. Identifies and implements energy-saving strategies, such as renewable energy

	integration and energy-efficient system configurations. 2.5. Ensures that engineering projects comply with sustainability standards and regulations, promoting long-term environmental stewardship. 2.6. Communicates sustainable design practices and their benefits clearly, encouraging stakeholders to prioritise eco-friendly solutions in project development.

EE0001 -13: Engineering Mathematics II

The aim of this study unit is to provide students with an advanced understanding of mathematical methods, including differential equations, complex numbers, and numerical techniques, and their application to solving engineering problems. Emphasis will be placed on utilizing these mathematical tools to analyse and model electrical and electronic systems. The unit prepares students to approach complex engineering challenges with strong mathematical problem-solving skills, particularly in the areas of dynamic systems and electrical circuit analysis.

Learning Outcome:	Assessment Criteria:
1. Apply advanced mathematical methods, such as differential equations and complex numbers, to solve engineering problems.	1.1. Demonstrates proficiency in applying advanced mathematical methods, including differential equations and complex numbers, to solve engineering problems. 1.2. Effectively uses differential equations to model and solve dynamic engineering systems, such as mechanical or electrical systems. 1.3. Utilises complex numbers to analyse and solve problems involving oscillations, alternating current (AC) circuits, and wave phenomena. 1.4. Applies appropriate mathematical techniques to simplify complex engineering problems and obtain accurate solutions. 1.5. Integrates advanced mathematical methods with engineering principles to optimise system performance and design. 1.6. Communicates mathematical solutions clearly, providing step-by-step explanations and justifications for the methods used in solving engineering problems.
2. Use numerical techniques to analyse electrical and electronic systems.	2.1. Demonstrates a strong understanding of numerical techniques, such as finite difference methods and numerical integration, for analysing electrical and electronic systems. 2.2. Applies appropriate numerical methods to solve complex electrical circuit problems, including transient and steady-state analysis. 2.3. Utilises software tools and algorithms effectively to simulate and analyse electrical and electronic systems under various conditions. 2.4. Evaluates the accuracy and reliability of numerical results, considering factors like convergence, error margins, and

	computational limitations. 2.5. Identifies and addresses potential issues in numerical analysis, ensuring valid and efficient solutions to engineering problems. 2.6. Communicates numerical analysis results clearly, providing well-structured explanations and visualisations to support technical decision-making.

EE0001 -14: Power Systems Analysis

The aim of this study unit is to equip students with the knowledge and skills necessary to analyse power generation, transmission, and distribution systems. Students will gain an understanding of the components, operation, and performance of power systems and learn to evaluate system stability, efficiency, and reliability. The unit will emphasize the use of computational tools to simulate and assess the behaviour of power systems, ensuring that students are able to analyse real-world power system performance and stability under various operating conditions.

Learning Outcome:	Assessment Criteria:
1. Analyse power generation, transmission, and distribution systems.	1.1. Demonstrates a comprehensive understanding of the principles behind power generation, transmission, and distribution systems, including key components and processes. 1.2. Analyses the performance of power generation systems, considering factors such as efficiency, capacity, and fuel sources. 1.3. Evaluates the design and operation of transmission systems, focusing on voltage regulation, loss minimisation, and grid stability. 1.4. Assesses distribution systems, including load balancing, protection schemes, and the integration of renewable energy sources. 1.5. Identifies potential issues in power generation, transmission, and distribution, proposing solutions to optimise system performance and reliability. 1.6. Communicates analysis findings clearly, using technical terminology and visual aids to explain system performance and potential improvements.
2. Use computational tools to evaluate the performance and stability of power systems.	2.1. Demonstrates proficiency in using computational tools and simulation software to model and evaluate power system performance and stability. 2.2. Accurately applies computational techniques to analyse key power system parameters, including voltage stability, load flow, and fault analysis. 2.3. Utilises software tools to simulate different

	operating conditions and assess the impact of changes on system stability and efficiency. 2.4. Interprets simulation results effectively, identifying potential stability issues and areas for improvement in power system design. 2.5. Identifies and applies optimisation methods to enhance system performance, such as load balancing and reactive power compensation. 2.6. Communicates the results of computational analysis clearly, providing actionable insights and recommendations for improving power system stability.

EE0001 -15: Analogue **Electronics**

The aim of this study unit is to provide students with a comprehensive understanding of the design, analysis, and practical application of analogue electronic circuits. Students will learn the fundamental principles behind the operation of key components such as resistors, capacitors, transistors, and operational amplifiers (op-amps), and how they are used to create oscillators, amplifiers, filters, and other analogue circuits. The unit also focuses on the operation and application of integrated circuits (ICs) in real-world electronic systems.

Learning Outcome:	Assessment Criteria:
1. Design and analyse analogue circuits, including oscillators and amplifiers.	1.1. Demonstrates comprehensive understanding of analogue circuit design principles, including the ability to analyse and evaluate key components such as resistors, capacitors, and inductors. 1.2. Effectively applies theoretical knowledge to design oscillators and amplifiers, ensuring functional efficiency and adherence to industry standards. 1.3. Accurately selects appropriate components for circuit designs based on desired performance specifications and constraints. 1.4. Analyses and verifies the stability, frequency response, and gain characteristics of analogue circuits through simulation tools and practical testing. 1.5. Identifies and resolves potential design flaws or performance limitations in oscillator and amplifier circuits through troubleshooting and iterative refinement. 1.6. Communicates complex analogue circuit designs and analysis findings clearly, both verbally and in written reports, adhering to professional standards.
2. Understand the operation of integrated circuits in practical applications.	2.1. Demonstrates a clear understanding of the basic principles of integrated circuit (IC) operation and their applications in various electronic systems. 2.2. Effectively identifies the key components and functions of different types of ICs, including logic gates, amplifiers, and voltage regulators. 2.3. Applies theoretical knowledge to analyse the performance of ICs in real-world circuits, considering factors such as power consumption, signal integrity, and thermal management. 2.4. Evaluates the suitability of specific ICs for

	particular applications, considering design constraints and operational requirements. 2.5. Troubleshoots issues related to ICs in practical applications, using diagnostic tools and methods to ensure functionality and reliability. 2.6. Demonstrates the ability to communicate technical insights on IC operations and their practical applications clearly and concisely in both written and verbal formats.

EE0001 -16: Embedded Systems and Applications

The aim of this study unit is to provide students with the fundamental knowledge and practical skills required to design and program embedded systems for specific applications. Students will learn to integrate hardware and software components effectively, ensuring optimal performance and efficiency of embedded systems. The unit covers the entire embedded systems development lifecycle, from hardware selection and system design to programming and system integration, enabling students to create robust, real-time applications in diverse engineering fields.

Learning Outcome:	Assessment Criteria:
1. Design and program embedded systems for specific applications.	1.1. Demonstrates a deep understanding of embedded system architecture, including microcontroller selection, input/output interfacing, and memory management. 1.2. Effectively applies software development techniques to program embedded systems, ensuring functionality, efficiency, and adherence to application requirements. 1.3. Utilises industry-standard programming languages and development environments to design, code, and debug embedded systems. 1.4. Analyses system requirements and translates them into embedded software specifications, optimising code for performance and resource constraints. 1.5. Conducts rigorous testing and validation of embedded systems to ensure reliable operation and compliance with performance standards. 1.6. Communicates design decisions, programming processes, and system outcomes clearly in technical documentation and presentations.
2. Integrate hardware and software components for efficient system operation.	2.1. Demonstrates a clear understanding of the interaction between hardware and software components in a system, ensuring seamless integration for optimal performance. 2.2. Effectively selects and configures hardware components to meet system requirements, considering factors such as power, speed, and compatibility. 2.3. Develops and implements software solutions that efficiently interface with hardware, ensuring smooth data flow and communication between components. 2.4. Identifies and resolves integration issues, such as timing, synchronization, or resource

	conflicts, to achieve a stable system operation. 2.5. Performs thorough testing of the integrated system, validating hardware and software performance against established specifications and standards. 2.6. Communicates integration processes, challenges, and solutions clearly in technical reports and presentations to stakeholders.

EE0001 -17: Electrical Energy Systems

The aim of this study unit is to provide students with a comprehensive understanding of the principals involved in the generation, conversion, and distribution of electrical energy. Students will explore different energy sources, technologies for energy conversion, and methods for efficient energy distribution. The unit will also emphasize evaluating the performance and efficiency of various electrical energy systems, enabling students to assess and optimize energy systems for sustainability and reliability in real-world applications.

Learning Outcome:	Assessment Criteria:
1. Understand the principles of electrical energy generation, conversion, and distribution.	1.1. Analyse the fundamental principles governing electrical energy generation, including conventional and renewable sources. 1.2. Evaluate the key processes involved in energy conversion, considering efficiency, losses, and technological advancements. 1.3. Assess the mechanisms of electrical energy transmission and distribution, ensuring compliance with industry standards. 1.4. Examine the impact of power quality, load management, and system stability on distribution networks. 1.5. Interpret technical schematics and specifications related to electrical generation, conversion, and distribution systems. 1.6. Apply regulatory and safety requirements in the design and operation of electrical energy infrastructure.
2. Evaluate the performance and efficiency of different energy systems.	2.1. Analyse key performance indicators and efficiency metrics for various energy systems, considering operational and environmental factors. 2.2. Assess the advantages and limitations of conventional and renewable energy systems based on technical and economic criteria. 2.3. Interpret efficiency curves, load profiles, and energy conversion rates to optimise system performance. 2.4. Compare energy losses, sustainability impacts, and lifecycle costs across different energy generation methods. 2.5. Evaluate the role of emerging technologies in enhancing energy system efficiency and reducing waste. 2.6. Apply industry standards and best practices in performance assessment and energy management strategies.

EE0001 -18: Signals and Systems

The aim of this study unit is to provide students with a solid foundation in the analysis of signals and systems, focusing on both time-domain and frequency-domain approaches. Students will learn the principles of signal processing, including the mathematical representation of signals, the transformation of signals between domains, and the design and implementation of basic signal processing techniques. This unit will equip students with the tools necessary to analyse and manipulate signals in various engineering applications, including communications, audio, and control systems.

Learning Outcome:	Assessment Criteria:
1. Analyse signals and their transformations in time and frequency domains.	1.1. Examine the fundamental properties of signals, including periodicity, symmetry, and energy or power classification. 1.2. Apply mathematical techniques to represent and manipulate signals in both time and frequency domains. 1.3. Evaluate Fourier series, Fourier transforms, and Laplace transforms for signal analysis and system characterisation. 1.4. Compare the effects of different signal processing techniques on time-domain and frequency-domain representations. 1.5. Assess the impact of noise, filtering, and modulation on signal integrity and transmission. 1.6. Interpret and validate signal transformations using analytical and computational methods aligned with industry standards.
2. Design and implement basic signal processing techniques.	2.1. Develop signal processing algorithms using appropriate mathematical models and computational tools. 2.2. Apply filtering, modulation, and transformation techniques to enhance signal quality and extraction of relevant information. 2.3. Evaluate the effectiveness of designed signal processing methods in noise reduction, compression, and feature extraction. 2.4. Implement digital and analogue signal processing techniques, ensuring adherence to industry standards. 2.5. Analyse the performance of signal processing systems using appropriate metrics and validation methods. 2.6. Integrate hardware and software solutions for real-time signal processing applications.

EE0001 -19: Principles of Automation and Robotics

The aim of this study unit is to provide students with a fundamental understanding of automation and robotic systems. Students will explore the key principles of robotics, including the design, modelling, and control of robotic systems. The unit emphasizes the integration of automation technologies in industrial and engineering applications. Students will also learn to design and simulate simple robotic systems using basic control techniques, enabling them to understand how robots interact with their environment and perform tasks autonomously.

Learning Outcome:	Assessment Criteria:
1. Understand the fundamentals of automation and robotic systems.	1.1. Analyse the core principles and components of automation and robotic systems, including sensors, actuators, and controllers. 1.2. Evaluate different types of automation, such as fixed, programmable, and flexible automation, in various industrial applications. 1.3. Assess the role of robotics in manufacturing, healthcare, and other sectors, considering efficiency and precision. 1.4. Examine control architectures, including open-loop and closed-loop systems, for automation and robotics. 1.5. Interpret technical documentation, schematics, and programming logic used in robotic and automated systems. 1.6. Apply safety standards, ethical considerations, and regulatory requirements in the design and operation of automation and robotic systems.
2. Design and simulate simple robotic systems using basic control techniques.	2.1. Develop basic control algorithms for robotic systems, including proportional, integral, and derivative (PID) control techniques. 2.2. Design robotic systems incorporating sensors and actuators, ensuring effective interaction between hardware and software components. 2.3. Simulate robotic systems using industry-standard software to analyse and optimise control system performance. 2.4. Assess the impact of control techniques on system stability, accuracy, and response time in various operational scenarios. 2.5. Integrate feedback mechanisms to enhance the performance and adaptability of robotic systems. 2.6. Apply safety protocols and design considerations to ensure the reliability and functionality of simulated robotic systems.

EE0001 -20: Industrial Electronics

The aim of this study unit is to provide students with a thorough understanding of the design, analysis, and application of electronic circuits used in industrial environments. The unit will focus on power electronics, industrial drives, and automation systems, highlighting the role of electronics in controlling and optimizing industrial processes. Students will learn the principles behind electronic systems that drive industrial machinery, manage energy conversion, and ensure efficient operation of automated systems in various industries.

Learning Outcome:	Assessment Criteria:
1. Design and analyse circuits used in industrial applications, such as power electronics and drives.	1.1. Develop circuit designs for industrial applications, focusing on power electronics, motor drives, and control systems. 1.2. Analyse the performance of circuits under different operating conditions, considering efficiency, load handling, and thermal management. 1.3. Evaluate the use of power semiconductors, such as transistors, diodes, and thyristors, in industrial circuit designs. 1.4. Apply control strategies to optimise the performance of motor drives, including variable frequency drives (VFDs) and servo systems. 1.5. Assess the impact of circuit design on energy consumption, cost-effectiveness, and system reliability in industrial settings. 1.6. Ensure compliance with industry standards and safety regulations in the design and operation of power electronics circuits.
2. Understand the role of electronic systems in industrial automation.	2.1. Analyse the integration of electronic systems within industrial automation, focusing on sensors, actuators, and control systems. 2.2. Evaluate the role of programmable logic controllers (PLCs) and microcontrollers in automating industrial processes. 2.3. Assess the impact of electronic systems on system efficiency, reliability, and scalability in industrial automation applications. 2.4. Examine communication protocols, such as fieldbus and Ethernet, used to connect electronic systems in automation environments. 2.5. Interpret the influence of electronic systems on process monitoring, data acquisition, and decision-making in automated systems. 2.6. Apply industry standards and best practices for the design, implementation, and maintenance of electronic systems in industrial automation.

EE0001 -21: Communication Systems Engineering

The aim of this study unit is to provide students with a solid foundation in the principles and applications of both analogue and digital communication systems. Students will gain an understanding of how information is transmitted, received, and processed over various communication channels. The unit focuses on analysing the performance of communication systems under different conditions, such as noise, interference, and bandwidth limitations, and explores techniques to optimize signal transmission and system reliability.

Learning Outcome:	Assessment Criteria:
1. Understand the principles of analogue and digital communication systems.	1.1. Analyse the fundamental principles of analogue and digital communication, including modulation, encoding, and transmission techniques. 1.2. Evaluate the advantages and limitations of analogue and digital communication systems in terms of signal quality, noise resistance, and bandwidth efficiency. 1.3. Assess key components of communication systems, such as transmitters, receivers, and transmission media, in both analogue and digital contexts. 1.4. Examine the role of signal processing, error correction, and data compression in enhancing the performance of communication systems. 1.5. Interpret the mathematical models and theories underlying analogue and digital communication, including Fourier analysis and sampling theory. 1.6. Apply industry standards for designing and evaluating communication systems, ensuring optimal performance and compliance with regulatory requirements.
2. Analyse the performance of communication systems under different conditions.	2.1. Evaluate the impact of noise, interference, and distortion on the performance of communication systems in various environments. 2.2. Analyse the bit error rate (BER), signal-to-noise ratio (SNR), and capacity of communication channels under different conditions. 2.3. Assess the effects of channel fading, bandwidth limitations, and multipath propagation on system performance. 2.4. Simulate communication system performance using software tools, considering both ideal

	and non-ideal conditions. 2.5. Compare the performance of different modulation schemes, coding techniques, and error correction methods under varying signal conditions. 2.6. Apply industry standards and protocols to optimise system performance and ensure reliable communication in diverse operational scenarios.

EE0001 -22 Renewable Energy Technologies

The aim of this study unit is to provide students with an in-depth understanding of the working principles, technologies, and applications of renewable energy systems. Students will explore the key renewable energy sources, including solar, wind, hydro, and bioenergy, and examine how these sources are harnessed for sustainable power generation. The unit will also focus on the design, analysis, and optimization of basic renewable energy solutions, such as solar and wind power systems, equipping students with the necessary skills to contribute to the transition towards sustainable energy practices.

Learning Outcome:	Assessment Criteria:
1. Evaluate the working principles and applications of renewable energy systems.	1.1. Demonstrates a thorough understanding of the working principles of various renewable energy systems, including solar, wind, hydroelectric, and biomass technologies. 1.2. Analyses the operational mechanisms of renewable energy systems, considering efficiency, energy conversion, and system integration with existing infrastructure. 1.3. Evaluates the environmental and economic impacts of renewable energy systems, including their sustainability, cost-effectiveness, and potential for reducing carbon emissions. 1.4. Assesses the practical applications of renewable energy technologies in different sectors, such as residential, industrial, and commercial uses. 1.5. Identifies and evaluates the challenges and limitations associated with the implementation and scalability of renewable energy systems. 1.6. Communicates findings on renewable energy systems, including technical evaluations and application recommendations, effectively to both technical and non-technical audiences.
2. Design basic renewable energy solutions, such as solar and wind power systems.	2.1. Demonstrates a clear understanding of the fundamental design principles behind solar and wind power systems, including component selection and system configuration. 2.2. Effectively designs solar and wind energy systems to meet specified energy requirements, considering factors such as location, climate, and load demands. 2.3. Applies relevant calculations and methodologies to determine optimal system

	sizing, ensuring maximum efficiency and reliability of renewable energy solutions. 2.4. Integrates key components such as solar panels, inverters, wind turbines, and batteries into a cohesive and functional renewable energy system. 2.5. Evaluates the performance of designed systems through simulation or practical testing, ensuring they meet energy production and operational standards. 2.6. Communicates design processes, system specifications, and expected outcomes clearly, providing both technical and non-technical stakeholders with understandable documentation.

EE0001 -23: Electrical Project Management

The aim of this study unit is to equip students with the knowledge and skills necessary to plan, execute, and manage electrical engineering projects effectively. Students will learn how to apply project management principles and tools to oversee electrical projects, ensuring successful outcomes within scope, budget, and timeline. The unit will cover resource allocation, scheduling, risk management, and quality control, specifically tailored to the needs of electrical engineering projects in various industries.

Learning Outcome:	Assessment Criteria:
1. Plan and manage electrical engineering projects, including resource allocation and scheduling.	1.1. Demonstrates a strong understanding of project management principles, including planning, resource allocation, and scheduling specific to electrical engineering projects. 1.2. Effectively develops detailed project plans, defining clear goals, deliverables, timelines, and resource requirements for successful project execution. 1.3. Utilises project management tools and techniques to allocate resources efficiently, ensuring optimal use of personnel, equipment, and materials. 1.4. Manages project timelines, tracking progress against milestones and making adjustments as necessary to meet deadlines and budget constraints. 1.5. Identifies and mitigates risks associated with electrical engineering projects, ensuring adherence to safety, quality, and regulatory standards. 1.6. Communicates project status, challenges, and outcomes clearly to stakeholders, providing regular updates and final reports.
2. Apply project management tools to ensure successful project completion.	2.1. Demonstrates proficiency in using project management software and tools to plan, monitor, and control project activities. 2.2. Effectively applies tools for resource allocation, risk management, and scheduling to ensure project objectives are met on time and within budget. 2.3. Utilises project tracking tools to monitor progress, identify potential delays, and implement corrective actions to keep the project on track. 2.4. Coordinates communication between team members and stakeholders using project management platforms, ensuring clear and efficient information flow.

	2.5. Evaluates project performance using tools to assess quality, costs, and timelines, making data-driven decisions to enhance project outcomes. 2.6. Prepares comprehensive reports and updates, leveraging project management tools to present key metrics, issues, and solutions to stakeholders.

EE0001 -24: Technical Report Writing and Research Methods

The aim of this study unit is to equip students with the skills necessary for effective technical writing and the use of research methods in engineering. Students will learn how to document and present research findings, project results, and technical analyses in a clear, structured, and professional manner. The unit also focuses on developing students' ability to apply various research methodologies to solve engineering problems and communicate results effectively through written reports.

Learning Outcome:	Assessment Criteria:
1. Develop technical writing skills for documenting research and project findings.	1.1. Demonstrates a clear understanding of technical writing principles, including clarity, precision, and the use of appropriate terminology for documenting research and project findings. 1.2. Effectively structures technical documents, ensuring logical flow, coherence, and accessibility for the intended audience. 1.3. Develops concise, accurate, and well-researched content, adhering to industry standards for technical writing and documentation practices. 1.4. Utilises tools and techniques to enhance the presentation of complex technical information, ensuring it is understandable and accessible to both technical and non-technical audiences. 1.5. Revises and edits written content to ensure consistency, accuracy, and adherence to specified guidelines and formats. 1.6. Communicates research and project findings clearly through well-organised reports, proposals, and presentations, effectively conveying key insights and recommendations.
2. Use research methods to solve engineering problems and present results effectively.	2.1. Demonstrates a strong understanding of various research methods, including experimental, analytical, and computational techniques, for solving engineering problems. 2.2. Effectively applies appropriate research methods to define engineering problems, collect data, and generate solutions based on evidence and analysis. 2.3. Utilises relevant tools and technologies to analyse data, ensuring accurate interpretation and application of results to solve engineering challenges. 2.4. Develops clear, structured reports that communicate research findings,

	methodologies, and conclusions in a way that is understandable to both technical and non-technical audiences. 2.5. Evaluates and interprets the limitations of research methods, considering factors such as accuracy, precision, and potential biases in results. 2.6. Presents research findings effectively, using visual aids, technical language, and data analysis to support conclusions and recommendations.

EE0001 -25 Advanced Power Electronics

The aim of this study unit is to provide students with advanced knowledge and skills in the design, analysis, and application of power electronic converters and systems. The unit will focus on more complex power electronic devices, including converters, inverters, and controllers, and how they are applied in modern engineering systems, particularly in renewable energy and industrial automation. Students will learn to evaluate the performance of power electronics systems and design solutions for efficient energy conversion and management.

Learning Outcome:	Assessment Criteria:
1. Design and analyse advanced power electronic converters and systems.	1.1. Demonstrates a comprehensive understanding of the principles and operation of advanced power electronic converters, including DC-DC, AC-DC, and DC-AC systems. 1.2. Applies mathematical models and simulation tools to design efficient power electronic converters, considering factors such as switching frequency, voltage regulation, and thermal management. 1.3. Analyses the performance of power electronic systems, assessing efficiency, reliability, and stability under various operating conditions. 1.4. Evaluates the selection of power components such as transistors, diodes, and capacitors to ensure optimal performance in the converter design. 1.5. Identifies and resolves issues related to harmonics, power quality, and electromagnetic interference in power electronic systems. 1.6. Communicates the design, analysis, and testing processes of power electronic systems effectively to both technical and non-technical stakeholders.
2. Understand the applications of power electronics in renewable energy and industrial automation.	2.1. Demonstrates a thorough understanding of how power electronics are applied in renewable energy systems, including solar, wind, and energy storage technologies. 2.2. Analyses the role of power electronic converters in integrating renewable energy sources into the grid, ensuring efficient energy conversion and management. 2.3. Evaluates the use of power electronics in industrial automation, focusing on motor control, robotics, and automated manufacturing systems. 2.4. Identifies key challenges in applying power electronics to renewable energy and

	industrial automation, including efficiency, reliability, and system integration. 2.5. Assesses the impact of power electronics on the performance and cost-effectiveness of renewable energy systems and automated industrial processes. 2.6. Communicates the applications, challenges, and benefits of power electronics in these sectors clearly to both technical and non-technical audiences.

EE0001 -26 Smart Grid Technology

The aim of this study unit is to provide students with a comprehensive understanding of smart grid technology, focusing on its components, functionality, and role in modern electrical power systems. Students will explore the integration of renewable energy sources into the smart grid, addressing challenges related to energy distribution, grid stability, and the management of decentralized energy resources. The unit will equip students with the skills to design, analyse, and develop solutions that enhance the efficiency, reliability, and sustainability of the smart grid.

Learning Outcome:	Assessment Criteria:
1. Analyse the components and functionality of smart grid systems.	1.1. Demonstrates a comprehensive understanding of the key components of smart grid systems, including advanced metering, communication networks, and control systems. 1.2. Analyses the functionality of smart grids in terms of energy distribution, load management, and integration of renewable energy sources. 1.3. Evaluates the role of sensors, data analytics, and automation in enhancing the efficiency, reliability, and resilience of smart grid operations. 1.4. Assesses the interoperability of smart grid components, ensuring seamless communication and coordination across various system elements. 1.5. Identifies potential challenges in smart grid systems, including cybersecurity, data privacy, and integration with existing infrastructure. 1.6. Communicates technical insights regarding the components, functionality, and benefits of smart grids to a range of stakeholders.
2. Develop solutions for integrating renewable energy sources into the smart grid.	2.1. Demonstrates a deep understanding of the technical requirements for integrating renewable energy sources, such as solar and wind, into smart grid systems. 2.2. Develops strategies for energy storage, demand response, and grid balancing to ensure smooth integration and reliability of renewable energy sources. 2.3. Designs solutions that enable bidirectional communication between renewable energy systems and the smart grid, optimising energy flow and grid stability. 2.4. Assesses the impact of renewable energy integration on grid performance, considering

	factors such as variability, power quality, and efficiency. 2.5. Identifies and addresses challenges related to the scalability, cost, and regulatory compliance of integrating renewable energy into existing smart grids. 2.6. Communicates integration strategies and outcomes clearly, providing stakeholders with actionable insights and recommendations for effective implementation.

EE0001 -27: Electrical Machine Design

The aim of this study unit is to provide students with the knowledge and skills to design efficient and reliable electrical machines, such as motors, transformers, and generators. Students will learn how to apply core design principles and methodologies to develop machines that meet performance, efficiency, and operational reliability standards. The unit will also focus on evaluating and optimizing machine performance under varying operating conditions, considering factors such as thermal management, material selection, and system integration.

Learning Outcome:	Assessment Criteria:
1. Apply design principles to develop efficient and reliable electrical machines.	1.1. Demonstrates a solid understanding of the design principles behind electrical machines, including motor types, magnetic field theory, and electromagnetic principles. 1.2. Applies analytical methods and design tools to optimise the performance of electrical machines, focusing on efficiency, reliability, and operational longevity. 1.3. Evaluates key factors such as material selection, thermal management, and load conditions to ensure the electrical machine meets performance and safety standards. 1.4. Designs electrical machines with appropriate consideration for cost-effectiveness, scalability, and environmental impact. 1.5. Analyses and tests electrical machine designs to verify their operational efficiency, stability, and reliability under different conditions. 1.6. Communicates design concepts, calculations, and test results clearly to stakeholders, ensuring transparency and understanding of the machine's capabilities and limitations.
2. Evaluate the performance of machine designs under different operating conditions.	2.1. Demonstrates the ability to assess the performance of machine designs under a variety of operating conditions, including load variations, temperature fluctuations, and speed changes. 2.2. Utilises appropriate simulation tools and analytical methods to predict machine performance and identify potential issues related to efficiency, torque, and power output. 2.3. Evaluates the impact of environmental factors, such as humidity, vibration, and noise, on the performance and reliability of machine designs. 2.4. Conducts experimental testing to validate the predicted performance of machine designs, ensuring accuracy and reliability of results.

	2.5. Identifies and resolves performance limitations, proposing design modifications or improvements to enhance efficiency and reliability. 2.6. Communicates performance evaluations clearly, providing detailed reports and recommendations based on testing results and analytical findings.

EE0001 -28 Advanced Control Systems

The aim of this study unit is to provide students with advanced knowledge and practical skills in designing and implementing sophisticated control strategies for dynamic systems. The unit will focus on the application of modern control theory, including state-space representation, optimal control, robust control, and adaptive control. Students will learn to utilize computational tools and simulation techniques to analyse, design, and optimize control systems for real-world engineering applications, ensuring enhanced performance, stability, and robustness.

Learning Outcome:	Assessment Criteria:
1. Design and implement advanced control strategies for dynamic systems.	1.1. Demonstrates a deep understanding of advanced control theories, such as adaptive, optimal, and robust control, and their application to dynamic systems. 1.2. Applies control algorithms to model and analyse dynamic systems, ensuring stability, performance, and responsiveness under varying conditions. 1.3. Designs control strategies that account for system uncertainties, nonlinearities, and external disturbances to optimise system behaviour. 1.4. Utilises simulation tools to test and validate control strategies, ensuring their effectiveness in real-world dynamic systems. 1.5. Implements control systems using appropriate hardware and software, ensuring seamless integration with the dynamic system and reliable operation. 1.6. Communicates control design processes, strategies, and outcomes clearly, providing technical documentation and performance analyses for stakeholders.
2. Use computational tools to simulate and optimize control system performance.	2.1. Demonstrates proficiency in using computational tools and software for simulating control system behaviour, including MATLAB, Simulink, and other relevant platforms. 2.2. Effectively applies simulation techniques to model control systems, assessing their performance under various scenarios and operating conditions. 2.3. Utilises optimization algorithms to fine-tune control system parameters, improving efficiency, stability, and response time. 2.4. Analyses simulation results to identify potential issues such as overshoot, instability,

	or performance degradation, and proposes adjustments to enhance system performance. 2.5. Integrates real-time data and feedback into simulations to more accurately reflect system dynamics and improve control strategies. 2.6. Communicates simulation results and optimisation outcomes clearly, providing detailed analyses and recommendations for system improvements.

EE0001 -29: High Voltage Engineering

The aim of this study unit is to provide students with a comprehensive understanding of the principles of high voltage generation, insulation, and the behaviour of high voltage systems. The unit focuses on the design and analysis of high voltage systems, exploring the methods used for generating, controlling, and insulating high voltages in electrical power systems. Students will also study the impact of high voltage on materials and the behaviour of electrical systems under different high voltage conditions, equipping them with the knowledge to work safely and effectively with high voltage technologies in power systems and other electrical engineering applications.

Learning Outcome:	Assessment Criteria:
1. Understand the principles of high voltage generation and insulation.	1.1. Demonstrates a thorough understanding of the principles behind high voltage generation, including methods such as transformer stepping, rectification, and voltage multiplier circuits. 1.2. Analyses the design and operation of high voltage systems, including the role of components like transformers, capacitors, and insulators in voltage regulation. 1.3. Evaluates the physical principles of insulation materials, including their dielectric properties and suitability for various high voltage applications. 1.4. Understands the safety considerations involved in high voltage generation, focusing on insulation, grounding, and protection mechanisms. 1.5. Assesses the impact of environmental factors such as temperature, humidity, and pressure on the performance of high voltage systems and insulation. 1.6. Communicates technical concepts related to high voltage generation and insulation clearly, ensuring safety standards and operational guidelines are well-understood.
2. Analyse the behaviour of high voltage systems under various conditions.	2.1. Demonstrates a comprehensive understanding of the factors influencing the behaviour of high voltage systems, including load variations, temperature changes, and environmental conditions. 2.2. Utilises analytical methods and simulation tools to model and predict system behaviour under different operational scenarios, such as fault conditions, overloads, and transients. 2.3. Assesses the performance of high voltage

	components, including insulation, conductors, and switchgear, under varying stress conditions and their ability to withstand electrical and mechanical stresses. 2.4. Identifies and evaluates potential risks in high voltage systems, such as breakdowns, insulation failure, and electrical arcing, and proposes mitigation strategies. 2.5. Analyses the effects of system design, including voltage regulation and protection schemes, on overall system stability and performance. 2.6. Communicates findings on system behaviour under different conditions clearly, providing technical recommendations for enhancing performance and ensuring safety.

EE0001 -30: Instrumentation and Process Control

The aim of this study unit is to provide students with advanced knowledge and practical skills in designing and implementing instrumentation systems for industrial applications and applying process control techniques to ensure system stability and efficiency. Students will gain a deep understanding of various instrumentation components, measurement systems, and control strategies used to monitor and regulate industrial processes. The unit will equip students with the tools and techniques necessary to optimize process performance, enhance automation, and ensure safety in complex industrial environments.

Learning Outcome:	Assessment Criteria:
1. Design and implement advanced instrumentation systems for industrial applications.	1.1. Demonstrates comprehensive understanding of advanced instrumentation principles and their application in industrial environments. 1.2. Designs instrumentation systems that meet industry standards for accuracy, reliability, and efficiency. 1.3. Integrates appropriate sensors, controllers, and data acquisition systems to address complex industrial requirements. 1.4. Ensures compliance with relevant regulatory and safety standards during the design and implementation phases. 1.5. Applies advanced troubleshooting techniques to identify and resolve issues in instrumentation systems. 1.6. Provides clear documentation and technical reports detailing system design, implementation processes, and operational outcomes.
2. Apply process control techniques to maintain system stability and efficiency.	2.1. Demonstrates a deep understanding of process control theory and its application to industrial systems. 2.2. Selects and implements appropriate control strategies to maintain optimal system performance. 2.3. Utilises advanced control algorithms to stabilise processes and improve operational efficiency. 2.4. Analyses system dynamics and responds to disturbances using corrective control measures. 2.5. Ensures that control systems are robust, scalable, and adaptable to changing operational conditions. 2.6. Provides detailed performance analysis and optimisation recommendations based on system data and control outcomes.

EE0001 -31: Advanced Embedded Systems

The aim of this study unit is to provide students with advanced skills in designing and developing embedded systems for complex applications. Students will learn to integrate hardware components such as microcontrollers, sensors, and actuators, and develop software to enable real-time control and interaction with physical systems. The unit will focus on advanced programming techniques, hardware interfacing, system optimization, and real-time operating systems (RTOS) to build efficient, reliable, and scalable embedded solutions for a wide range of applications in automation, robotics, and IoT.

Learning Outcome:	Assessment Criteria:
1. Develop complex embedded systems using advanced programming and hardware techniques.	1.1. Demonstrates expertise in advanced programming languages and hardware design for embedded systems. 1.2. Develops efficient, scalable, and reliable embedded systems that meet specified functional and performance requirements. 1.3. Integrates advanced hardware components, ensuring compatibility and optimal system performance. 1.4. Utilises industry-standard development tools and methodologies to design and test embedded systems. 1.5. Addresses real-time constraints and resource limitations to optimise embedded system functionality. 1.6. Produces comprehensive documentation, including source code, schematics, and system specifications, for future maintenance and upgrades.
2. Integrate sensors and actuators for real-time control applications.	2.1. Selects and integrates suitable sensors and actuators to meet real-time control application requirements. 2.2. Develops interfaces between sensors, actuators, and control systems ensuring seamless communication. 2.3. Applies advanced signal processing techniques to ensure accurate sensor data acquisition and actuator control. 2.4. Ensures system reliability by testing and calibrating sensor-actuator integration in various operating conditions. 2.5. Utilises real-time software platforms to optimise data flow and control responses in dynamic environments. 2.6. Provides clear documentation of sensor-actuator integration processes, including system configurations and performance metrics.

EE0001 -32: Energy Storage and Conversion Systems

The aim of this study unit is to provide students with a comprehensive understanding of energy storage technologies and their application in the field of energy conversion systems. Students will learn to evaluate the performance of various energy storage devices such as batteries, supercapacitors, and advanced storage technologies. They will also gain the knowledge to design and optimize systems for efficient energy storage and conversion, with a focus on maximizing energy efficiency, scalability, and sustainability. This unit is critical for applications in renewable energy systems, electric vehicles, grid storage, and other energy-intensive industries.

Learning Outcome:	Assessment Criteria:
1. Evaluate the performance of energy storage technologies, such as batteries and supercapacitors.	1.1. Demonstrate comprehensive knowledge of various energy storage technologies, including batteries and supercapacitors, and their operational mechanisms. 1.2. Critically assess the efficiency, reliability, and lifespan of different energy storage systems. 1.3. Analyse the environmental impact and sustainability of energy storage technologies, considering materials and disposal. 1.4. Evaluate the economic viability of energy storage solutions in different sectors and applications. 1.5. Assess the performance of energy storage technologies under various real-world conditions, including load cycling and temperature fluctuations. 1.6. Provide evidence-based recommendations for improving the performance and scalability of energy storage technologies.
2. Design systems for efficient energy storage and conversion.	2.1. Apply principles of energy storage technologies to design systems that maximise efficiency in energy conversion and storage. 2.2. Integrate advanced energy storage solutions, such as batteries and supercapacitors, to optimise performance across different applications. 2.3. Evaluate system components, including energy storage devices, inverters, and controllers, for maximum energy conversion efficiency. 2.4. Consider environmental factors and sustainability in the selection and design of energy storage systems. 2.5. Conduct simulations and modelling to validate the effectiveness of designed systems under varied operating conditions. 2.6. Propose innovative approaches to improve the scalability and cost-effectiveness of energy storage and conversion systems.

EE0001 -33: Wireless and Optical Communication

The aim of this study unit is to provide students with a deep understanding of the principles, technologies, and applications of wireless and optical communication systems. Students will explore the fundamental concepts, including modulation techniques, signal propagation, and optical transmission, and will develop the ability to analyse and design communication systems for various environments. The unit will equip students with the skills to assess system performance, address challenges related to interference and noise, and optimize the design of both wireless and optical communication networks in real-world scenarios.

Learning Outcome:	Assessment Criteria:
1. Understand the principles and technologies behind wireless and optical communication systems.	1.1. Demonstrate a solid understanding of the fundamental principles of wireless and optical communication systems. 1.2. Analyse key technologies, such as modulation techniques, signal processing, and transmission methods, used in wireless and optical communication. 1.3. Evaluate the impact of factors like bandwidth, noise, and interference on the performance of communication systems. 1.4. Assess the role of fibre optics, wireless protocols, and emerging technologies in modern communication networks. 1.5. Understand the theoretical foundations and practical applications of wireless and optical communication in different industries. 1.6. Explore current trends and advancements in wireless and optical communication technologies.
2. Analyse the performance of communication systems in different environments.	2.1. Evaluate the impact of various environmental factors, such as noise, interference, and signal attenuation, on communication system performance. 2.2. Analyse the performance of communication systems in different propagation environments, including urban, rural settings. 2.3. Assess the effects of weather conditions, such as rain or fog, on wireless and optical communication systems. 2.4. Use appropriate measurement tools and techniques to quantify the performance of communication systems under varying environmental conditions. 2.5. Compare the performance of different modulation and coding schemes in diverse environmental scenarios. 2.6. Propose solutions to optimise communication system performance in challenging or complex environments.

EE0001 -34: Electromagnetic Compatibility

The aim of this study unit is to provide students with a comprehensive understanding of electromagnetic compatibility (EMC) principles and practices in electrical and electronic systems. Students will learn to identify the sources and effects of electromagnetic interference (EMI), and gain the skills to design systems that meet EMC standards and regulations. The unit will focus on techniques for mitigating EMI, ensuring system performance, and compliance with international EMC standards in various industries, including consumer electronics, telecommunications, automotive, and industrial automation.

Learning Outcome:	Assessment Criteria:
1. Identify and mitigate electromagnetic interference in electrical and electronic systems.	1.1. Identify sources of electromagnetic interference (EMI) in electrical and electronic systems. 1.2. Analyse the impact of EMI on system performance, including signal degradation and equipment malfunction. 1.3. Evaluate various EMI mitigation techniques, such as shielding, grounding, and filtering, for effectiveness in different environments. 1.4. Design strategies to reduce EMI in systems, ensuring compliance with international electromagnetic compatibility (EMC) standards. 1.5. Assess the trade-offs between EMI mitigation and system performance, considering cost and complexity. 1.6. Conduct testing and measurements to validate the success of EMI reduction methods in real-world conditions.
2. Design systems to meet electromagnetic compatibility standards.	2.1. Apply electromagnetic compatibility (EMC) principles to design systems that meet relevant international standards. 2.2. Identify potential sources of electromagnetic interference (EMI) and design solutions to mitigate their impact on system performance. 2.3. Integrate shielding, grounding, and filtering techniques to ensure compliance with EMC requirements. 2.4. Evaluate the design and layout of electrical circuits and components to minimise EMI and optimise electromagnetic immunity. 2.5. Conduct simulations and measurements to assess system performance against EMC standards. 2.6. Incorporate industry best practices and regulatory guidelines to ensure the system operates reliably in electromagnetic environments.

EE0001 -35: Capstone Project

The aim of this study unit is to provide students with the opportunity to apply their theoretical and practical knowledge gained throughout their studies in a comprehensive engineering project. This project will require students to design, implement, and evaluate an engineering solution to a real-world problem, utilizing a variety of technical, managerial, and problem-solving skills. The unit will foster teamwork, project management, and communication abilities, preparing students for professional practice and further academic pursuits.

Learning Outcome:	Assessment Criteria:
1. Apply theoretical and practical knowledge to design and implement a comprehensive engineering project.	1.1. Utilise theoretical knowledge of engineering principles to develop a detailed project design, ensuring technical accuracy and feasibility. 1.2. Apply practical skills to implement the design, managing resources, timelines, and project constraints effectively. 1.3. Conduct thorough analysis and testing throughout the project to ensure functionality, safety, and adherence to engineering standards. 1.4. Integrate interdisciplinary knowledge to address complex challenges and optimise project outcomes. 1.5. Employ project management techniques, including risk assessment and quality control, to guide the project from conception to completion. 1.6. Document the design process and results, providing clear, professional reports that align with industry standards.
2. Demonstrate project management, teamwork, and problem-solving skills.	2.1. Exhibit effective project management skills by organising tasks, setting priorities, and meeting deadlines in a collaborative environment. 2.2. Demonstrate strong teamwork abilities, contributing to group discussions, delegating responsibilities, and supporting team members to achieve common goals. 2.3. Apply problem-solving techniques to identify challenges, analyse solutions, and implement practical resolutions within the project scope. 2.4. Communicate clearly and professionally with team members and stakeholders 2.5. Manage resources efficiently, balancing time, budget, and personnel to achieve optimal results. 2.6. Evaluate the success of project outcomes, using feedback to identify areas for improvement and refine future processes.

EE0001 -36: Professional Development and Ethical Practices

The aim of this study unit is to provide students with a comprehensive understanding of the ethical responsibilities and professional standards expected of electrical engineers. It emphasizes the importance of integrity, accountability, and ethical decision-making in engineering practice. The unit equips students with strategies for continuous learning, professional growth, and career advancement, ensuring they are prepared for a successful and evolving career in the engineering field.

Learning Outcome:	Assessment Criteria:
1. Understand the ethical responsibilities of an electrical engineer and the importance of professionalism.	1.1. Demonstrate a clear understanding of ethical responsibilities in electrical engineering, including the need for honesty, integrity, and transparency. 1.2. Recognise the impact of engineering decisions on society, the environment, and public safety, ensuring responsible practice. 1.3. Adhere to professional codes of conduct and regulatory standards, maintaining high ethical standards in all aspects of work. 1.4. Assess the importance of continuous professional development and staying informed about industry trends and emerging technologies. 1.5. Foster a commitment to diversity, equity, and inclusion in engineering practice and collaboration with colleagues. 1.6. Reflect on the role of an electrical engineer in promoting sustainable and socially responsible solutions to engineering challenges.
2. Develop strategies for continuous learning and career growth in the engineering field.	2.1. Identify key areas for continuous learning in engineering, focusing on emerging technologies and industry trends. 2.2. Set personal and professional development goals, incorporating both technical skills and soft skills. 2.3. Engage in formal education, certifications, and workshops to enhance knowledge and expertise in specific engineering disciplines. 2.4. Participate in professional networks, conferences, and forums to stay connected with industry leaders and expand career opportunities. 2.5. Seek mentorship and guidance from experienced engineers to gain insight into career progression and personal growth. 2.6. Regularly assess career goals, adapting strategies to evolving interests, industry demands, and professional aspirations.

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