TECHNICAL ENGINEER DIPLOMA IN ELECTRICAL ENGINEERING (CLEAN ENERGY)

MODULE OBJECTIVES

Core Modules

Technical Mathematics
On completion of the module, students should be able to mathematically model physical, electrical, information technology, mechanical as well as business management problems. They should also be able to use their mathematical knowledge to cope with diverse tasks in electrical engineering, to use problem-solving techniques to cope with job-related and application-related tasks, and to present and interpret results.

Electrical Engineering
On completion of the module, students should be able to solve fundamental problems in electrical engineering through the safe handling of basic electrical quantities and laws, to analyse basic electrical engineering circuits and their combinations, as well as to determine operating parameters through the safe handling of measuring devices. They should also be able to use industry-standard programs to describe and visualize basic circuits and to check dimensioning tasks.

Digital and Microcomputer Technology
On completion of the module, students should be able to apply basic terms and functions of binary information processing, coding of characters and digits as well as to analyse and develop typical and special switching networks. They should also be able to transfer the design of switching networks and switching mechanisms to programmable logic components and to analyse the interaction of the functional units of a microcomputer system.

Electronics I
On completion of the module, students should be able to design, set up, test and analyse work related electronic application circuits, to measure electrical and non-electrical variables as well as to use computer-aided processes to record, process and control measurement.

Computer Science I
On completion of the module, students should be able to develop structured programs and be able to analyse, design and evaluate application programs.

Automation and Communication Systems I
On completion of the module, students should be able to apply basic functioning of control systems to create programs and solve technical control tasks and to integrate and network components in communication systems.

Power Distribution System I
On completion of the module, students should be able to apply concept of electrical energy and its safety as well as to set up, operate, commission and maintain power energy plant, electrical installations, electrical drives, devices or systems.

Business Management & Communications I
On completion of the module, students should be able to create, analyse the requirements and contents of an annual financial statement, apply full or marginal costing on a case- by-case basis, and can derive production and sales decisions. They should be able to determine capital requirements, differentiate between types of finance and their alternatives, and both execute and evaluate case-related financing. They should be able to develop an understanding of the motivation and communication processes in professional situations. It also includes leading themselves and others, successfully form operational processes and solve problems that arise in a creative and goal-oriented fashion.

Clean Energy Technology I
On completion of the module, students should be able to install, test and maintain Photovoltaic (PV) system and to maintain Battery Energy Storage System (BESS).

Planning and Documentation
On completion of the module, students should be able to plan and implement projects in accordance with functional specifications, rules, regulations and standards as well as to create documents using computer-aided processes.

Electronics II
On completion of the module, students should be able to design, set up, test and analyse job-related applications and power electronics processes.

Computer Science II
On completion of the module, students should be able to develop object-oriented programs as well as to analyse, evaluate and visualize IoT data.

Automation and Communication Systems II
On completion of the module, students should be able to select and program microcontroller for various applications as well as to develop and connect applications using IoT.

Power Distribution System II
On completion of the module, students should be able to operate power generation plant and energy storage system, to plan and design energy transmission and energy distribution and to analyse smart energy system to meet green practices.

Business Management & Communications II
On completion of the module, students should be able to formulate marketing goals, assign marketing instruments, describe the completion and fulfilment of contracts and present the legal consequences of contractual anomalies on the basis of case studies. They should be competence in personal, social, emotional, methodological and equip with cognitive skills, priority management and presentation skills to enable them to motivate others.

Clean Energy Technology II
On completion of the module, students should be able to design Photovoltaic (PV) system, configure smart PV system and evaluate the benefits, cost and Return on Investment (ROI) of a commercial PV project.

Final Year Project
On completion of the module, students should be able to apply the skills and knowledge acquired from the course into practice. The assigned or selected project will be guided and monitored by a Project Supervisor. Students are expected to plan, execute, evaluate, monitor the progress and exercise time management on their group project within the project time. This will include the purchasing of required material. A format presentation, with proper documentation and a completed written report are expected from the students.

Elective Modules

Network Technology
On completion of the module, students should be able to analyse, structure, plan, set up and document a network as well as to select, configure and commission network components and protocols. They should also be able to organize and monitor data exchange between local networks and virtual subnets as well as to apply system security to networks.

Electromobility
On completion of the module, students should be able to assess the influence and contribution of electric mobility to the desired energy transition and describe the design criteria and interaction of storage, power electronics, motor and transmission as well as to describe the concepts of the charging technology and infrastructure for emission-reduced or emission free energy supply of vehicles with the integration of the charging technology into building installation and building automation.

Smart Energy
On completion of the module, students should be able to assess a forward-looking energy centre with regard to the desired energy transition and carry out basic design of the interaction of smart energy centres, generator systems, storage systems and the charging infrastructure, taking in account the integration of the systems into the building installation and building automation.

Smart Home
On completion of the module, students should be able to plan, configure and assess smart home system with complex scenes using smart home components from different manufacturers integrated as one overall system and set up applications for operating and visualizing the smart home on mobile devices and/or operator terminals. They should also be able to extend the control of the smart home with voice control, use remote access options for monitoring and operating the smart home with cloud access.

Energy Management and Audit
On completion of the module, students should be able to analyse energy consumption data and recommend measures to reduce energy consumption.