

Module Synopses

MC 1 - Certificate in Electrical and Digital Circuit Fundamentals

Module 1 - Electrical Principles

Covers the basic laws and theorems that govern the operation of electrical circuits. Topics covered include scientific notation, engineering notation, metric prefixes, definitions of energy and power, power sources, measuring instruments, DC and AC concepts, simple series and parallel networks, electromagnetism, inductor, inductance, transformers, Kirchhoff's Voltage and Current Laws, Current and Voltage Divider Rules.

Module 2 - Digital Principles

Covers the principles and design techniques to enable students to design simple combinational circuits using commercial SSI and MSI integrated circuits. Simple sequential logic circuits such as flip-flops and mono-stables are also introduced.

MC 2 - Certificate in Electronics

Module 1 - Analog Electronics

Builds upon and extends the fundamentals covered in Electrical Principles. Topics covered include capacitor, capacitance, Superposition Theorem, semiconductor physics, semiconductor devices such as diodes, special diodes and bipolar transistors, transducers such as thermistors, and application of operational amplifiers.

Module 2 - Digital Electronics

Builds upon and extends the fundamentals covered in Digital Principles. More complex circuits such as adders, multiplexers/de-multiplexers, decoders/encoders, counters and shift registers are covered.

MC 3 - Certificate in Electrical Circuits and Systems

Module 1 - Circuit Theory and Analysis

Builds upon and extends the fundamentals covered in Electrical Principles. Topics covered include mesh analysis, nodal analysis, circuit theorems and applications, three-phase systems that comprise three-phase supply and loads. This module provides the basic foundation for subsequent certificate courses in power engineering.

Module 2 - Photovoltaic System Design

Builds upon and extends the fundamentals covered in Electrical Principles and Analogue Electronics. Topics covered include solar radiation calculations, different types of PV modules, and systems, design of grid-ties PV system and standalone PV system, electrical installation requirements according to the CP5 regulations or equivalent.

MC 4 - Certificate in Power Distribution

Module 1 - Electrical Installation Design

Builds upon and extends the knowledge covered in Electrical Principles and Circuit Theory and Analysis. Topics covered include an overview of the power generation, transmission and distribution system, electrical safety and protection principles, analyse and design electrical systems based on the relevant codes of practices, testing and troubleshooting of electrical installation circuits, application of technology such as the European Installation Bus (EIB) system in electrical installation.

Module 2 - Power Transmission and Distribution

Builds upon and extends the knowledge covered in Electrical Principles and Circuit Theory and Analysis. Topics covered include the main equipment such as cables, transformers, and circuit breakers and associated protective devices used in the transmission and distribution of electrical power; standard requirements for effective delivery of electrical energy through HV transmission and distribution networks to various types of consumers; principles, characteristics and applications of various types of protective relays; installation, maintenance and testing of electrical distribution systems with good engineering practices in accordance to the relevant Codes of Practices/Standards.

MC 5 - Certificate in Power Systems

Module 1 - Power System Analysis

Builds upon and extends the knowledge covered in Power Transmission and Distribution. Topics covered include power plant generators, frequency and voltage control and power grid analysis which comprises power system representation, power flow used in planning and operating environments, stability of system voltages and frequency, harmonics calculations and power quality issues and mitigations.

Module 2 - Power Electronics and Drives

Builds upon and extends the knowledge covered in Electrical Principles and Analogue Electronics. Topics covered include the characteristics and applications of power semiconductor devices, various power converters such as AC controllers, phase-controlled rectifiers, choppers and inverters, DC motors and AC motors used in electrical drives.