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 PLC and Control System

Module 1 - PLC Applications

Topics covered include PLC architecture, input and output connection, device selection, programming, testing and troubleshooting. PLC programming language will cover standard languages including ladder logic, function blocks and structured texts.

Module 2 - Control System 1

This module aims to provide foundational knowledge and techniques of basic control systems. Topics covered include control system representation using block diagram, system performance analysis, basic controller concepts and controller tuning techniques. Single-loop feedback control is the central theme of the module.

MC 4 - Certificate in Network and Control

Module 1 - Network and Control Applications

Topics covered are networking fundamentals, ISO 7-layer communication model, TCP/IP, IP addressing, router and switch configuration, industrial networks, fieldbus technology, DeviceNet and SCADA systems. Emphasis will be given to the integration of the different networks.

Module 2 - Control System 2

This module covers advanced topics in Control System. Build on the understanding of single-loop control systems, multi-loop strategies including cascade, ratio, feedforward and selective control are discussed. The applications of different types of controllers are covered. Concepts related to digital control are introduced. Control system documentation techniques are provided.

MC 5 Certificate in Sensors and Fieldbus

Module 1 - Sensors and Instrumentation

Topics covered are basic measuring concepts & instrumentation, temperature sensors, pressure sensors, flowmeters, strain gauges, signal conditioning for instrumentation, calibration and Advanced Instrumentation.

Module 2 - Fieldbus Technology

The module aims to equip students with the knowledge to apply fieldbus technology to link instruments and field devices in a manufacturing plant to control system. Fieldbus is an industrial network system for real-time distributed control. The technologies covered are HART, Foundation Fieldbus and PROFIBUS. Strong emphasis will be given to the application of these technologies in the area of process and discrete manufacturing industries.