

# **Module Synopses**

## **Semester One**

### 1. Power Quality and Energy System

This module furnishes participants on the causes of power quality issues, voltage dips and their effects on sensitive process and facilities, harmonics distortion and its effects on power system equipment, mitigation methods and power quality monitoring. Participants will learn the principles of different energy resources, including stand-alone and grid connected system, how to implement fuel cell technology in a variety of applications. The module also covers lighting technology principles and efficient lighting practices. The working principles/configurations of DC, AC and Chopper drives and various application areas of electrical drives will be covered.

### 2. Dynamics & Control

This module introduces the basic principles of automatic control and illustrates the application of these principles in modern control systems. Topics include mathematical models, dynamic analysis, stability analysis, frequency response analysis, s-plane analysis and compensation techniques.

### 3. Electrical Services Design

This module aims to provide students with an in-depth understanding and design methodology of the various electrical building services. In particular, the module will cover the design, specifications and selection of electrical installation, lighting system, lightning protection system, and EIB system. Relevant Acts and Regulations governing the design of these various electrical services will also be discussed in detail in the module.

### 4. Power Distribution System in Buildings

This module aims to provide students with working and in-depth knowledge on the planning, design and commissioning of high and low voltages (230V – 22kV) electrical installation and distribution systems in commercial, residential and industrial buildings. Relevant Acts and Regulations, Code of Practices and Standards together with the operation, selection and sizing of various system components such as standby generator, switchgear and transformer will also be included in this module.

## **Semester Two**

### 5. Electric Drives & Control

This module aims to provide knowledge to students on the practical aspects of industrial drives. The topics cover DC Drives, AC Drives, Step Motor Drives and their applications, motor sizing, protection and drive system installation.

### 6. Programmable Logic Controller for Building Services

This module aims to introduce to the students the basic concepts and the principles of programmable logic controller (PLC) related to industry and building automation applications. It also covers the various programming and related sensor technologies for automation and the uses of programmable controllers in industry and building automation like pump control, compressor control, chiller control, lighting control and lift control.

### 7. Air-Conditioning Systems Design & Operation

This module provides students with a working knowledge of the design principles and the operation of air-conditioning systems such as used in both, commercial and industrial buildings. Particular emphasis is placed on the operation and maintenance of such systems. Routine operation and maintenance procedures of such systems are also covered.

### 8. Integrated Building Management System for Energy Efficiency

This module provides an integrated system approach to understanding Building Automation and Facility Management Systems and their applications to energy efficiency for building services. It covers the system architectures, hardware and software integration, digression, communication methods, and application software of modern building automation systems. It also provides good working knowledge of how to specify, design, install, commission, operate, and maintain an Integrated Building Management System (IBMS). Application areas will include air-conditioning systems, fire detection and alarm systems, security systems and other essential building services like sanitary and domestic water systems. Hands-on training sessions, case studies and mini projects for energy efficiency in building carried out through IBMS will also be conducted extensively.