

Module Synopses

Semester One

1. Engineering Mathematics

This module provides students with essential mathematical techniques for solving problems in electrical engineering. Emphasis is placed on numerical methods, practical applications and adaptability of computer usage. Topics covered include various transform methods, matrices, vector algebra and numerical methods of solving differential equations.

2. Dynamics & Control

This module aims to provide a thorough understanding of the fundamentals of control engineering and applications. Topics include mathematical modeling, transient analysis, error analysis and introduction to system optimization, stability analysis, s-plane analysis, frequency response analysis and compensation techniques. Basic control actions and industrial automatic controllers as well as advanced control techniques.

3. Instrumentation & Measurement System

This module provides students with a comprehensive coverage on the area of instrumentation and measurement systems, with an emphasis on computer based modern instrumentation systems. In addition to the traditional areas of instrumentation like sensors and transducers, controllers and control valves, signal conditioning and recorders, this module will also cover some major developments in intelligent instrumentation including GPIB interfaced instruments, discrete signal conditioning and data conversion board and bus based instruments.

4. Programmable Logic Control

This module introduces the basic concepts and latest development in programmable controller technologies used in automation applications. Topics include structure of PLC, ladder diagram programming, control system design, advanced instruction sets, intelligent I/O modules, local area networks, supervisory control and data acquisition in PLC systems.

Semester Two

5. Digital Control

This module teaches modern control theories and the role of digital computers in process control systems. Topics include sampled-data control, direct digital control, supervisory control, distributed control, state-space method, multivariable, optimal, stochastic and adaptive systems.

6. Computer Control Systems

This module provides students with the knowledge and practical experiences in intelligent controllers that are employed in process control industries. This module aims at providing a comprehensive study to the latest developments in computer control systems and their applications. In addition hardware and software involved in computer control system, design of computer controller using frequency domain approach and supervisory control and data acquisition topics will be taught.

7. Fieldbus Technology

This module provides student with technical and practical knowledge and skills of intelligent control systems that are employed in the factory, process plants and building automation areas. Strong emphasis is placed on the use of modern digital communication networks for the horizontal and vertical integration of typical control and monitoring equipment in a plant. Various Fieldbus technologies will be discussed in terms of concepts, configuration, and installation & troubleshooting.

8. Process Control Engineering

This module provides an integrated system approach to the understanding of behaviour of process control systems. Basic theoretical principles of automatic process control and to illustrate how these principles are used in modern industrial applications is presented. Operation and behaviour of practical process control systems are emphasised. Topics include introduction to process control, process dynamics, dynamic behaviour of process control loops, controller characteristics, and multi-loop control. The topics in this course is generally targeted towards process industries such as petroleum, petrochemical, chemical, pulp & paper, mining, power, pharmaceutical & food processing.