

Module Synopses

PDC1

Advanced Programmable Logic Controllers

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.

Dynamics & Control

This module aims to provide a thorough understanding of the fundamentals of control engineering and applications. Topics include mathematical modelling, 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.

PDC2

Instrumentation & Measurement Systems

This module provides students with comprehensive coverage in the area of instrumentation and measurement systems, with an emphasis on computer-based modern instrumentation systems. The module will touch on the traditional areas of instrumentation like sensors and transducers, controllers and control valves, signal conditioning and recorders. In addition, it will cover some developments in the internet-of-things (IoT) as a system of entities that exchange information and interact with the physical world by sensing, processing information, and activating.

AI for Automation

This module covers the basics of artificial intelligence (AI) and machine learning (ML). It deals with different types of machine learning techniques like supervised, unsupervised and reinforcement learning. It aims to equip students with knowledge to implement AI and ML solutions for industrial automation systems. Students will learn the background theory and how to use AI and ML tools (e.g. Object Recognition technique). This will enable the students to apply AI and ML in the automation and robotics projects.

PDC3

Distributed Control System Applications

This module covers main topics known to DCS and its control configuration. It provides the skills how to implement and operate the system in a process plant. The course also covers the methods of installation, configuration and testing of the system. The course provides the participants with foundation of distributed process control and engineering of the DCS that hosts the plant management. At the end of this module, participants acquire a good knowledge of distributed process and its control system architecture. Participants will attend in more hands-on practices needed to implement a DCS solution. Participants are required to configure the system connected to the process pilot plants.

Participants understand the needs and troubles of a process plant run by a DCS system. They are able to enhance the skills of engineering and service tasks working in control field and process plants.

Computer Control Systems

This module will provide 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.

PDC4

Industrial Networks and Cybersecurity

Provides student with technical and practical knowledge and skills of industrial networks that are commonly 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.

The topic of cybersecurity will be introduced in this module. Network security and operation security related to industrial control system (ICS) will be covered.

Process Control Engineering

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.