

Module Synopses

PDC 1 Chemical Process Principles

Module 1 – CP1201 Material and Energy Balance

This module covers principles of material and energy balances. It enables learners to perform material and energy balances on common unit operations of chemical processes. Learners will apply the principles through hands-on sessions using small-scale pilot plant, process dynamic simulation software and process design simulation software.

Module 2 – CP1202 Thermodynamics

This module covers the principles of thermodynamics for steady and unsteady state systems. Learners would be able to derive relationships that quantitatively describe the transformation between different forms of energy on a macroscopic scale, and enable them to link the effects of thermodynamics to various process operations.

Module 3 – CP1203 Fluid Flow, Heat Transfer and Mass Transfer

This module covers the fundamental principles and processes of fluid flow, heat and mass transfer, as well as their application in the process industry. Learners will be equipped with relevant knowledge and skills to operate and troubleshoot fluid flow, heat and mass transfer equipment.

PDC 2 Chemical Process Design and Operation

Module 4 – CP1204 Separation Processes

This module covers design and operation of classical and advanced separation processes that are commonly found in the chemical industry. Learners will be attuned to the complex relationships between various process parameters and gain competence in the operation and troubleshooting of these processes and their associated equipment.

Module 5 – CP1205 Chemical Reaction Engineering

This module applies chemical engineering principles in the areas of chemical reaction kinetics and reactor design. Factors affecting reaction kinetics are studied to understand the interactions of mass and heat transfers with fluid flow in reactor design and operation. Various models for reactors will be studied, compared and contrasted to enable the selection of appropriate reactor to achieve maximum performance given any feed composition and operation conditions.

PDC 3 Chemical process control, optimisation and safety

Module 6 – CP1206 Process Control

This module covers the applications of control strategies (classical & advanced) and technologies to equip learners with up to date knowledge and skills to control automated systems in the process industry. Learners will be equipped with relevant knowledge and skills to monitor, control and troubleshoot automated processes in a safe manner.

Module 7 – CP1207 Process Optimisation

This module covers classical and latest process optimisation strategies and systems for the chemical industry. Classical deterministic and stochastic optimisation methods will be introduced for design and process operation optimisation. Learners will utilise software to solve formulated chemical engineering optimisation problems. Latest process control and optimisation implementation will be illustrated through real world examples.

Module 8 – CP1208 Process Safety

This module covers principles and applications of process safety strategies and safety management systems, with focus on relevant industrial standards and code of practices, in the process industry.

The following Modules run across 18 months throughout the programme

Module 9 – CP1209 Internship (On-The-Job Training)

This module enable learners to consolidate and apply theoretical knowledge in real-world on-the-job needs in the industry. Through this, relevant industry and occupational skills are deepened using the OJT blueprint developed by the company, subjected to approval by Singapore Polytechnic.

Module 10 – CP1210 Project

This module serves as a culmination of academic and intellectual experience for learners to investigate a problem or challenge in the area of chemical engineering. The project presents a real problem or challenge to learners to collaboratively work with the stakeholders to analyse, develop and present a resolved project outcome. Learners will be expected to demonstrate skills such as writing project proposal, experimental design, problem solving, oral communication, research capacity, media literacy, project planning, time management and personal effectiveness. Learners will be able to deepen their skills sets in core chemical engineering while broadening their soft skills to be a resourceful and resilient lifelong learner.