

WORK-STUDY DIPLOMA IN CHEMICAL PROCESS TECHNOLOGY

MODULE OBJECTIVES

Core Modules

Process Plant Occupational Safety, Health & Environmental Management

On completion of the module, trainees should be able to manage compliance with Workplace Safety and Health (WSH) Act, and Environmental Management System (EMS), with reference to relevant industrial standards and codes of practice in the chemical, oil and gas sectors. Trainees should also be able to perform hazard identification, risk assessment and control as well as apply in-house safety procedures in process plant.

Unit Operation 1

On completion of the module, trainees should be able to apply principles and operating characteristics of typical separation process in the petrochemical and chemical sectors. This process include solvent extraction, crystallisation, drying, evaporation, distillation, digestion, absorption, adsorption and material handling. Trainees should also be able to perform routine monitoring and inspection as well as basic corrective and preventative maintenance for process equipment.

Technical Communication & Documentation

On completion of the module, trainees should be able to interpret technical diagram and document, perform logging of process data and trends, hand-over process unit and plant, and apply standard radio communication protocol in process plant.

Applied Mathematics

On completion of the module, trainees should be able to apply essential mathematical knowledge and analytical skills needed to manage process unit.

Physic & Chemistry In Process Plant

On completion of the module, trainees should be able to apply essential physics and chemistry knowledge as required in process unit.

Material & Energy Balance

On completion of the module, trainees should be able to apply principles of chemical engineering to perform material and energy balances on common process unit.

Unit Operation 2

On completion of the module, trainees should be able to perform start-up and shut-down of reaction process unit, monitor reaction process unit and perform routine structured round checks to maintain safe and reliable operation. Trainees should also be able to apply principles and operating characteristics of reaction process unit for the petrochemical and chemical sectors.

Process Instrumentation & Control

On completion of the module, trainees should be able to monitor and control process quality parameters according to manufacturer's instructions and operating procedures.

Chemical Reaction Engineering

On completion of the module, trainees should be able to apply principles of chemical reaction engineering to reactor design and identify factors affecting reaction kinetics.

Fluid Mechanics & Thermodynamics

On completion of the module, trainees should be able to apply principles and effects of fluid mechanics and thermodynamics in process operation.

Heat & Mass Transfer

On completion of the module, trainees should be able to perform calculations on conductive and convective heat, and mass transfer, as well as heat exchanger and mass transfer equipment.

Company Project (Chemical Process Technology)

On completion of the module, trainees should be able to apply continuous improvement tools and techniques to execute a project. They should also be able to apply project management skills, including teamwork, communication and conflict management.

On-the-Job Training I

On completion of the module, trainees should be able to apply and integrate Year 1 skills and knowledge acquired at ITE College, and further develop competencies at the workplace.

On-the-Job Training II

On completion of the module, trainees should be able to apply and integrate Year 2 skills and knowledge acquired at ITE College, and further develop competencies at the workplace.

On-the-Job Training III

On completion of the module, trainees should be able to apply and integrate Year 3 skills and knowledge acquired at ITE College, and further develop competencies at the workplace.

On-The-Job List of Skills

Work-Study Diploma in Chemical Process Technology

S/N	Proposed List of Skills
	<u>Environmental and Workplace Safety and Health</u>
1	Manage compliance with WSH Act - Perform Work at Height in Process Plant - Perform Work in Confined Space in Process Plant - Apply Workplace Safety and Health in Process Plant
2	Manage compliance with EMS
3	Perform workplace housekeeping
4	Perform work in compliance with EMS/WSH Act
5	Conduct activity-based risk assessment
6	Conduct behavioural-based safety observation
7	Conduct safety check on work area, safety signs, safety devices and equipment
8	Apply personal protective measures
	<u>Emergency Response</u>
9	Respond to emergency (as a response team member)
10	Facilitate emergency response exercise and drills
11	Execute emergency response plan and procedures
12	Mitigate impact of chemical spills
	<u>Process Operation</u>
13	Interpret Process Flow Diagrams (PFDs), Piping and Instrument Diagrams (P&IDs) and other engineering drawings
14	Perform process line tracing
15	Perform valve by-pass operation
16	Perform pre-start-up check and feedstock transfer or blending
17	Perform loading and unloading of solids and fluids
18	Perform inter-tank transfer
19	Prepare storage tank for maintenance
20	Perform feed and run-down switching
21	Perform start-up and shut-down of separation process unit
22	Perform start-up and shut-down of reaction process unit
23	Troubleshoot process unit upset
24	Troubleshoot process equipment
25	Interpret process parameters and system alarm using Distributed Control System (DCS)

S/N	Proposed List of Skills
26	Commission and decommission pump
27	Commission and decommission compressor
28	Commission and decommission turbine
29	Commission and decommission fin fan
30	Commission and decommission heat exchanger
31	Commission and decommission furnace
32	Commission and decommission incinerator
33	Commission and decommission boiler
34	Commission and decommission cooling tower
35	Perform routine logging, reporting and record keeping of field process parameters
36	Prepare process equipment for maintenance work
37	Perform routine monitoring and inspection for process equipment and system
38	Perform shift handover
39	Perform raw material/product sampling
40	Execute radio communication with control room and teams on field
	<u>Basic Process Equipment Maintenance</u>
41	Conduct work area preparation in compliance with work permit
42	Conduct strainer cleaning
43	Conduct blinding/de-blinding
44	Conduct filter change out
45	Perform utility hose connection
46	Check and analyse differential pressure for process equipment
47	Perform back flushing of cooler
48	Conduct lubricating oil/seal oil top up for process equipment
49	Perform maintenance of storage facility