

# NITEC IN CHEMICAL PROCESS TECHNOLOGY

## CERTIFICATION

Credits required for certification:

Core Modules	: 43
Specialisation Modules	: 7
Life Skills Modules	: 9
Elective Modules	: 6
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Total	: 65

## COURSE STRUCTURE

Module Title	Credits
<b>CORE MODULES</b>	
Occupational Health, Safety and Security	5
Product Quality and Environment Standards	7
Process Instrumentation and Control	7
Process Equipment and Operation	7
Fundamentals in cGMP	4
Plant Processes	5
Industry Attachment	8
<b>SPECIALISATION MODULES (CHOOSE ONE)</b>	
Biologics and Pharmaceutical Processes	7
Equipment Maintenance and Utilities	7
<b>ELECTIVES (COURSE SPECIFIC)</b>	
Basic Microbiology Techniques	3
Distributed Control System	3
Process Gas Chromatography	3
Waste Water Treatment and Processes	3
<b>ELECTIVES (GENERAL) AND LIFE SKILLS MODULES</b>	
For details, click <a href="#">here</a>	

*Note: The offer of electives is subject to the training schedule of respective ITE Colleges. Students are advised to check with their Class Advisors on the availability of the elective modules they intend to pursue.*

## MODULE OBJECTIVES

### Core Modules

#### Occupational Health, Safety and Security

On completion of the module, students should be able to apply skills and knowledge in performing workplace housekeeping, responding in emergency situations and rendering first aid. They should also be able to apply skills and knowledge in workplace safety, confined space safety, safety audits, risk assessment, permit-to-work system, LOTO, and electrical safety.

#### Product Quality and Environment Standards

On completion of the module, students should be able to apply statistical process control, perform instrumental analysis on petroleum and pharmaceutical products, perform chromatography, spectroscopy and air-pollution control test. They also learn to conduct tests on effluent waste, perform water quality tests, carry out waste treatment facility operation and handle gas emission upsets.

### Process Instrumentation and Control

On completion of the module, students should be able to perform line tracing and monitor process parameters. They also learn to carry out manual valve operation, control valve with handwheel operation, control valve by-pass operation, and perform instrument functionality check.

### Process Equipment and Operation

On completion of the module, students should be able to carry out pump operation, filter operation, heat exchanger operation, reactor operation, mixer operation and ejector operation. They also learn to load and unload material, perform inter-tank transfer, change-over of process equipment and collection of raw material and sampling.

### Fundamentals in cGMP

On completion of the module, students should be able to adhere to good documentation practices, carry out personal hygiene practices and sanitisation process, perform gowning procedure and handling of materials in the cleanroom. They also learn to carry out plant turnaround and changeover activities, report GMP deviations as well as perform media, buffer, reagents, solvent preparation and dispensing.

### Plant Processes

On completion of the module, students should be able to carry out distillation operation, gas absorber and gas adsorber operation. They also learn to carry out extraction unit operation, evaporator operation and crystalliser operation.

### Industry Attachment

The module provides opportunity for students to apply the concepts and skills acquired during institutional training in a real work environment; gain hands-on practical training pertaining to the Petrochemical, Bio-pharmaceutical and Process Instrumentation Industry.

## Specialisation Modules

### Biologics and Pharmaceutical Processes

On completion of the module, students should be able to perform seed and inoculum preparation activities, carry out bioreactor setup and process monitoring operation, perform CIP operation and SIP operation, monitor cell harvesting and filtration operation, perform chromatography column packing and operate large-scale chromatography and filtration equipment. They also learn to perform homogenisation and micronizing operation, carry out scrubber operation, isolator operation, phase separation, equipment cleaning operation and waste pre-treatment operation.

### Equipment Maintenance and Utilities

On completion of the module, students should be able to carry out reverse osmosis water plant operation, carry out boiler unit operation, carry out steam header and condenser unit operation and carry out compressed air unit operation. They also learn to perform maintenance on pipe system and equipment, check pump and compressor performance, troubleshoot abnormal conditions in pumps and compressors, and prepare process equipment for shutdown maintenance.

## Electives (Course Specific)

### Basic Microbiology Techniques

On completion of the module, students should be able to apply skills and knowledge in performing media preparation and sterilisation. The students will also learn testing skills in microbiological culture, identification and enumeration of microbes from industry samples.

### Distributed Control System

On completion of the module, students should be able to use distributed control system software to configure simple field control unit, function block as well as build and modify simple graphics and reports.

### Process Gas Chromatography

On completion of the module, students should be able to apply skills and knowledge to operate process gas chromatograph and conduct process gas chromatograph calibration. They also learn to service switching valve and conduct routine maintenance of the sampling system.

### Waste Water Treatment and Processes

On completion of the module, students should be able to apply skills and knowledge in performing setting up and commissioning of sand filtration system and conducting various water quality tests on raw water or wastewater specimens in accordance to safety and health parameters. They will also gain knowledge on the various water treatment processes and emerging water treatment technologies available in Singapore.

## Electives (General) and Life Skills Modules

For details, click [here](#).