

Advanced Certificate

Applied Chemical Engineering Certification to Oil, Gas & Chemical fields

10 days
Overview

GCA/PEA

LEVEL

Advanced

PURPOSE

This course provides a more in-depth knowledge on the operation and operating conditions of the material and processes in refining, petrochemical and heavy chemistry sites as well as a strong foundation in the use of process simulation software.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:
describe the main properties of fluids and phenomena in process engineering,
understand the operating conditions of equipment used in the process,
to explain the reasons for controls implemented.

WAYS AND MEANS

Specific and original documentation covering different topics from an applied angle.
Numerous applications and case studies related to industrial situations.
Data, diagrams, graphs, various correlations presented in one single ring binder for easy reference after the course.

LEARNING ASSESSMENT

Quiz at the end of each module.

PREREQUISITES

It is recommended that participants have notions of thermodynamics (the basics learnt during engineering studies are sufficient).

WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Advanced Certificate delivered.
- An expertise confirmed in Applied Chemical Engineering Certification.
- Ready-to-use skills.

MORE INFO

Training session split into three independent modules. To be eligible for certification, participants must attend all three modules.

Agenda

MODULE 1: LIQUID-VAPOR EQUILIBRIA, DISTILLATION & PRELIMINARY DESIGN

3 d

Thermodynamics in liquid-vapor equilibria:

Material and energy balances in continuous processes.
Fluid properties, law of corresponding states, equations of state.
Liquid-vapor equilibria. Calculation principle.
Thermodynamic models applicable to hydrocarbon mixtures.
Non ideal mixtures, water-hydrocarbon mixtures.

Distillation:

Design principles of distillation columns.

Operating parameters of industrial distillation columns: material balance, pressure, operation of the liquid-vapor contact material, heat balance, implementation of reboilers and condensers, liquid-vapor traffics, temperature and composition profiles.

Distillation column control: basic control, sensitive tray, control of calculated variables, advanced control.

MODULE 2: FLUID FLOW & ROTATING EQUIPMENT

3 d

Thermodynamics applied to rotating equipment.

Fluid flow:

Characteristics of the single-phase liquid and gaseous flows.

Flow rate measurement with measuring devices.

Determining pressure drops in sites, influence of the valves.

Characteristic curve of a circuit, examples of typical circuits.

Liquid-gas two-phase flow map.

Pumping and compression:

Functions and elements of the main rotating equipment.

Operation of the centrifugal pumps and characteristic curves.

Connections pump-circuit. Adjustment to the operating conditions: changes in the flow rate, the product, temperature, cavitation.

Gas behavior during compression.

Operation of reciprocating and centrifugal compressors.

Adjustment to the operating conditions: change in the efficiency, operating limits.

MODULE 3: HEAT & ENERGY TRANSFER, PRELIMINARY DESIGN

4 d

Heat transmission:

Reminders on thermodynamics in heat transfer.

Conduction and convection: parameters that affect the exchange, means of calculation.

Radiation: emission, absorption, application to furnaces and boilers, tube skin temperature.

Exchangers - Furnaces and boilers:

Function, classification and terminology of heat exchangers.

Performances of the exchangers depending on the fluid circulation mode, evolutions depending on changes in the operating conditions.

Design principle of the exchangers and introduction to Energy Efficiency.

Combustion, Energy balance (radiation and convection zone) and efficiency determination of energy recovery in furnaces and boilers. Heat exchanges in the radiation section. Circulation of air and stack fumes.

Preliminary project:

An application related to the study of an industrial site allows the implementation of the knowledge acquired corresponding to the different disciplines of chemical engineering presented over the three training weeks, the great principles of design and an economic evaluation of the process.