

▲ Who should attend?

Graduate engineers and technical staff involved in the operation of refineries and petrochemical plants (production, maintenance, process control, laboratory analysis, ...).

▲ Duration

15 days

▲ Dates & Location

August 18 to
September 5, 2008
Rueil-Malmaison (Paris)

▲ Tuition Fees

€ 5,250

▲ Course Coordinator

Christian Tison

Ref. **GCA / PEA**

PROCESS ENGINEERING APPLIED TO REFINING AND PETROCHEMICAL OPERATION

OBJECTIVES

To provide the knowledge of the fundamentals of thermodynamics and physics used in equipment performance evaluation in the refining and petrochemical plants. The training covers fluid dynamics, heat transmission, liquid-vapor separation and also the functioning of related equipment.

On completion of the course, participants:

- have acquired knowledge of the main fluid properties
- have an overall, quantitative grasp of the phenomena encountered in fluid flow, heat exchange and liquid-vapor separation
- understand the operating conditions of rotating machinery and thermal equipment
- are able to analyze the operating conditions of catalytic processes and industrial columns and integrate the relevant process control systems.

COURSE CONTENT

PHYSICO-CHEMICAL PROPERTIES OF HYDROCARBONS AND HYDROCARBON MIXTURES

0.5 day

Chemical structure of hydrocarbons. Main types of organic compounds and their properties.
Physical properties of hydrocarbon mixtures, correlations.

APPLIED THERMODYNAMICS

2.5 days

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

APPLIED FLUID DYNAMICS

1.5 days

Characteristics of liquid and gas single-phase flow, flow rate measurement by flow element devices.
Determination of pressure drops in industrial plants, influence of control valves.
Circuit characteristics, examples of typical circuits.
Liquid-vapor **two-phase flow chart**.

HEAT TRANSMISSION

1.5 days

Conduction and convection: parameters affecting heat exchange, calculation methods.
Radiation: emission, absorption, application to furnaces and boilers, skin temperature.

INDUSTRIAL CHEMICAL REACTIONS

1 day

Conditions in which chemical reactions take place. Thermodynamic equilibrium.
Chemical kinetics, catalysis and catalysts. Examples of industrial implementations.

PUMPS AND COMPRESSORS

2.5 days

Main types of rotating machinery: technological pieces of equipment related to their process function.
Operation of centrifugal pumps and characteristic curves.
Pump-circuit coupling, adaptation to operating conditions: changes in flow rate, product, temperature, cavitation.
Gas compression behavior. Operation of reciprocating and centrifugal compressors.
Adaptation to operating conditions: evolution of yield, operating limits.

HEAT EXCHANGERS AND FURNACES

2 days

Function, classification, nomenclature and performances of heat exchangers according to circulation mode. Principles of heat exchanger design.
Combustion phenomena, distribution of supplied heat, furnace efficiency and energy recovery.
Performance monitoring: influence of operating conditions and fouling.
Variations in performance as a function of changes in operating conditions.
Furnace operation and process control.

DISTILLATION

2 days

Parameters of industrial column operation: material balance, pressure, operation of liquid-vapor contact equipment, heat balance, reboiler and condenser operation, liquid-vapor flows, temperature and composition profiles.
Distillation column process control: basic control, use of sensitive tray, control, advanced control.

PRE-PROJECT

1.5 days

A case-study related to a specific industrial plant enables participants to put into practice the knowledge of the different chemical engineering themes acquired during the training.

The different subjects are presented from a very practical point of view.

The teaching is backed up by a specific file including data, diagrams, charts and correlations used in the different technical areas of chemical engineering.

The hand outs serve as an easy-to-consult document after the course and include a large number of exercises and case studies based on industrial experience.