

# Applied Chemical Engineering for the Refining & Petrochemical Industries

80 days  
Overview

GCA/ACE

## LEVEL

Knowledge

## PURPOSE

This course provides a comprehensive understanding of the refining and petrochemistry chain involved and the equipment used in the refining and petrochemical industry.

## LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:  
understand the refining and petrochemical manufacturing schemes,  
grasp the fundamentals of chemical engineering,  
master the fundamentals of polymer chemistry,  
acquire the bases for investment decisions and capital budgeting in the refining and petrochemical industries.

## WAYS AND MEANS

Applications using process dynamic simulators (RSI IndissPlus simulator).  
Applications using static simulation software (PRO II).  
Two practical one week sessions, including pilot testing and site visits, are scheduled between September and December in Normandy and in the south of France.

## LEARNING ASSESSMENT

In the case certification is selected by the participant, 4 written and 1 oral tests have to be taken all along the program.

## PREREQUISITES

This course being a part of a IFP School Master program, the English and the academic level of the participant must be in line with a Master level. IFP School will accept the candidate referring to his TOIC or TOEFL score and his resume.

## WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Advanced Certificate delivered.
- An expertise confirmed in Applied Chemical Engineering for the Refining & Petrochemical Industries.
- Ready-to-use skills.

## MORE INFO

This course is administered alongside IFP School "Processes & Polymers Master" candidates. The course content corresponds to the first trimester of the Masters program.

## Agenda

## CHEMICAL ENGINEERING FUNDAMENTALS

12 d

Thermodynamics applied to liquid-vapor equilibria.  
Hydrocarbon physico-chemistry.  
Fluid dynamics.  
Heat transfer.  
Thermodynamics. Kinetics. Catalysis and chemical reactions.  
Industrial reactor design.

## PETROLEUM PRODUCTS & REFINING PROCESSES

20 d

Crude oil and petroleum products.  
Distillation (theory and dynamic simulation).  
Introduction to Provision simulation software (PROII) usage and application in a distillation project.  
Refining processes, process flow sheets and visit of a refinery.

## INDUSTRIAL EQUIPMENT & INSTRUMENTS

17 d

Materials and corrosion.  
Static equipment.  
Rotating machinery.  
Heat exchangers, furnaces and boilers.  
Instrumentation. Process control.  
Introduction to HTRI software usage and application in a heat-exchanger project.

## MONOMERS & POLYMERS MANUFACTURING

17 d

Olefins and aromatics in petrochemistry.  
Polymer chemistry, structure and characterization.  
Industrial reactor design of polymer reactors.  
Visits of a steamcracker unit, polymer units and plastic converters companies.

## ECONOMICS

1 d

Economics of supply and refining operations.

## CASE STUDIES

13 d

Two projects based on conception, design and cost estimation of an industrial distillation column (with PROII) and different heat exchangers (with HTRI).  
Two workshops are organized to design a CSTR styrene polymerization reactor and a LLDPE gas phase reactor.  
These studies are carried out by trainees with instructor guidance.