

This course can be adapted to virtual classroom mode - Advanced Certificate

## Base Chemicals & Polymers Manufacturing\*

80 days

PPM-EN-A

### Overview

#### LEVEL

Expert

#### PURPOSE

This course provides a comprehensive understanding of practical expertise in monomer manufacturing, polymerization processes, market and products, storage and transport of products, with attention to environmental, safety, quality and economic issues.

#### LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:

- participate in studies involving the design, sizing and economics of processes used in the refining, petrochemicals, polymers and plastics sectors,
- acquire the know-how for a position in production,
- acquire a thorough knowledge of industrial incidents and related safety and environmental issues,
- grasp the essence of the collaboration between R&D and Production departments,
- analyze the quality of manufactured products,
- understand the relationship between suppliers and manufacturers in the plastic's chain.

#### WAYS AND MEANS

- Case studies based on industrial situations.
- Visits to industrial sites.

#### LEARNING ASSESSMENT

Quiz.

#### PREREQUISITES

A degree corresponding to 4 or 5 years of higher education, such as a French 'Diplôme d'ingénieur' (in 5 years), an American BSc (in 4 years), or another equivalent degree.

#### WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Advanced Certificate delivered.
- An expertise confirmed in Base Chemicals & Polymers Manufacturing\*.
- Ready-to-use skills.

#### MORE INFO

Locations:

Rueil-Malmaison (Paris)

Ferrara (Italy) Alençon (France)

\*This program is the second part of a 16-month Master degree program at IFP school. It is highly recommended that participants be familiar with topics covered in the course "Applied Chemical Engineering for the Refining and Petrochemical Industries" (refer to ACE-EN-P).

## Agenda

### BASE CHEMICALS & MONOMERS MANUFACTURING

6 d

First and second generation monomers.  
Interaction between refining and petrochemical.  
Technical visit of an industrial plant (if possible).

### POLYMER CHEMISTRY & POLYMERIZATION REACTION ENGINEERING

4 d

Fundamentals of radical, ionic, catalytic..., polymerization.  
Polymer reaction engineering.

### ENGINEERING IN PETROCHEMICAL PROCESSES

13 d

Description of the main steps of a polymer project and methodology for organizing the sustainably safe and clean operation of petrochemical plants (HAZOP studies).  
Corrosion and materials.  
A PFD/PID project is organized with the support of an engineering company.

### COMMODITY PLASTICS

15 d

Chain value and manufacturing processes: polymerization reactions, unit description, main operating parameters, technical evolution of processes, troubleshooting, main producers, market trends, economics.  
A period of one week in Italy is organized with lectures, case studies and plant visits: development of a product (PP) and associated process, main characteristics of PP, industrial manufacturing process, main relations between the operating parameters and final characteristics of the product.

### MAIN ENGINEERING & HIGH PERFORMANCE PLASTICS

5 d

Specificities, advantages and drawbacks of standard polymers compared to engineering and high performance plastics.  
Discuss the inter-polymer competition.

### RISK MANAGEMENT

6 d

Methodology for organizing a sustainably safe and clean operation of a petrochemical plant.  
Reaction run-away and run-away prevention, powder explosions. How to handle toxic chemicals.  
Life cycle analysis of products.

### SUSTAINABLE DEVELOPMENT IN PETROCHEMICALS

7 d

Energy efficiency of the processes.  
Bio polymers and polymers environment.  
Regulatory affairs and chemical health effects.

### OVERVIEW OF POLYMER PROCESSING(1)

9 d

Structure of polymer processing industry.  
Various processing technologies.  
Optimum technico-economical selection of material during final product development.  
Resin specifications, process control and quality control.  
(1) 5 days are spent at the " Institut Supérieur de la Plasturgie ", in Alençon - France ( ISPA ).

### ELECTIVE COURSES: PETROCHEMICAL ECONOMICS OR PRODUCTION SUPPLY CHAIN

15 d

Petrochemical economics:  
General economics, competitor analysis, benchmarking.  
A project deals with the conceptual study of a new petrochemical plant project.  
Production supply chain:  
Logistics and transportation.  
A project deals with the design of a finishing section of a polyolefin plant.