Training - Low-carbon fuels and processes

BIOCPP-EN-P | Face-to-face only | 3 days

This session provides general technical information on the characteristics and processes leading to key bio-based products and intermediates: existing and developing biofuels, petrochemicals and chemicals

Level

Expert

Public

Professionals from different technical departments in sectors ranging from refining to petrochemicals or involved in the energy transition

Objectives

Attendees will be able to implement the following skills:
Upon completion of the training, participants will be able to:

- • List the main characteristics of bio-based products on the current market
- • describe the principle of existing and developing processes

Pedagogical & technical resources

- • Interactive course: active participation of the trainees through games and quizzes to grasp the key points of the course.
- • Joint construction of a diagram of all bio-processes.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

Meet at least one of the following criteria:
• Have 3 months of proven professional experience in the energy sector, in a technical position.
• Or have followed a training course oriented towards the introduction to refining or petrochemical processes.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CONTEXT AND FEEDSTOCKS — 0.5 day

Challenges of carbon-free energy and bioplastics in the context of climate change.
Associated environmental and regulatory framework.
Process development strategy.
Different types of biomass: sugar biomass, starchy biomass, oilseed biomass, waste.

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Biomass generations: 1G, 2G, 3G
Other feedstocks:

- CO2, low-carbon hydrogen.
- Recycled plastics.

BIOFUELS AND PETROCHEMICAL INTERMEDIATES — 0.5 day

Description of hydrocarbon molecules families: Olefins, Aromatics, Paraffins.
Main characteristics and specificities of the different biofuels and comparison between them:

- For gasoline engine (ETBE, ethanol).
- For diesel Engine (FAME, HVO).
- For Jet (HEFA, FT-SPK, ATJ, DSHC).
- For the maritime sector (Methanol, NH3, GNL).

Other energetic fuels (H2 /e-fuels).
Main intermediates for access to plastics or chemicals: Olefins, Aromatics, Methanol, Syngas.
Main polymers: Bio-based vs. biodegradable, bioplastics, recycled plastics.

LOW CARBON PROCESSES — 2 days

Overview of processes for transforming feeds into intermediate and finished products: feedstocks and treatments, process diagrams, different technologies when relevant, typical operating conditions, advantages and drawbacks, comparison and maturity.
Current processes:

- ethanol by fermentation.
- ETBE by etherification.
- FAME by transesterification.
- HVO-HEFA by hydrotreatment.
- Co-processing.

Advanced processes:

- Biogas by digestion
- Biomethane by digestion or methanation.
- Different routes to syngas.
- Methanol and Ammonia via Syngas.
- Fuels by Fischer-Tropsch via syngas.
- Olefins by dehydration of alcools (ethanol and methanol).
- Different routes for SAF by ATJ, DSHC.
- Bio-crude /Py-oil by pyrolysis of biomass, wastes or plastics.
- Bio-oil by hydrothermal liquefaction.
- E-fuels production.

Sessions

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Training - Upstream Panel Operator

PANELOP-EN-P | **Face-to-face only** | **30 days**

This course provides the required skills to hold the position of panel operator with the appropriate attitude towards plant operation safety issues. Allow proactive and efficient adaptation to the position of control room operator, based on professional experience of participants

IFP Training Certificate

Vocational Certificate

Level

Skilled

Public

Experienced production field operators called on to hold a panel operator position in Oil & Gas production facilities

Objectives

Attendees will be able to implement the following skills:

- Adopt the fundamental methodology and philosophy to operate Oil & Gas production facilities from the control room
- Be convinced of the absolute necessity of a proactive behavior and to implement an anticipatory operation
- Analyze and react methodically to anomalies, incidents and emergency situations in a safe manner
- Implement emergency procedures

Pedagogical & technical resources

- Very practical training course with numerous exercises and case studies on dynamic simulator derived from real life situations
- The training is entirely delivered on dynamic simulator replicating a DCS environment

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives
- An evaluation using simulator is realised at the end of each module

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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MODULE 1: PROCESS CONTROL, DCS & SIS — 5 days

Control room organization and panel operator role.
Panel operator reporting and handover duties. Plant documentation in control room.
Radio-communication.
Process control:

- Control loop. Field instrumentation.
- Controllers operating principles & parameters. Control loops structures.
- Standalone simulator: simple loop controller tuning and impact of P&ID actions; study of various control loop structures; typical transmitters faults.

Distributed Control System (DCS):

- DCS architecture and system components. Human-Machine Interface (HMI).
- HMI functions: trends, alarms... Automated sequences and Safety Instrumented Systems (SIS): PSS, ESD, HIPPS, EDP.

Examples of simulator exercises performed: DCS views and functionalities browsing; reading safety logics; package sequence analysis.

MODULE 2: WELL & PRODUCTION LINE OPERATION — 2.5 days

Reservoir conditions and production modes. Production principles and physics applied to well.
Surface wells and subsea wells: equipment, architectures, operating procedures.
Common well interventions. Production and injection wells monitoring. Common troubles.
Safety and prevention/protection barriers.
Examples of simulator exercises performed: well; production lines section parameters analysis; FPSO case.

MODULE 3: ROTATING MACHINERY OPERATION — 2.5 days

Centrifugal pumps:

- Technology, auxiliaries, operating parameters, protection systems.
- Pumps and operating conditions applied on simulator.
- Examples of simulator exercises performed: effect of a pressure decrease or level decrease in the upstream vessel; plugged strainer; gas carry-under.

Reciprocating compressors:

- Technology, auxiliaries, process circuit, operating parameters, protection systems.

Centrifugal compressors:

- Technology, auxiliaries, process circuit, operating parameters, control and protection systems applied on simulator.
- Examples of simulator exercises performed: effect of temperature change; surge conditions; start-up and shutdown sequences.

MODULE 4: SURFACE PROCESSING OPERATION — 5 days

Crude oil processing: stabilization, dehydration and desalting.
Gas processing: sweetening, dehydration, condensate recovery and fractionation.
Water processing: produced water treatment and introduction to injection water processing.
Examples of simulator exercises performed: influence of oil dehydration parameter; foaming symptoms; impact of TEG unit operating conditions; loss of a compressor; limited gas lift...

MODULE 5: SURFACE PROCESSING OPERATION/INTEGRATED PLANT OPERATION — 5 days

Alarms: priorities management and decision making.
Panel operator reporting, shift handover and take-over duties: shift report and impact of a faulty report through

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role play situations.
Global plant performance checks: identification and implementation of a routine checks roadmap: identifying key parameters and trending them to anticipate deviations.
Radio communication and other communication means. Communication good practices.
Oil transfer operations: storage and export, gas metering.
Analysis of an integrated plant behavior: inertia and interferences.
Analysis of production facilities shutdown philosophy: implementing safe plant shutdown procedure on simulator.

MODULE 6: INTEGRATED PLANT OPERATION/SAFETY IN OPERATION — 5 days

Analysis of production facilities start-up philosophy.
Implementing safe plant start-up procedure on simulator:

- Operating parameters analysis and anticipation of process upset.
- Generation of several malfunctions (by the instructor) to be fixed.

Learning to react and act to process upsets in a structured manner.
Identification, analysis and containment of process upsets according to the learnt methodology.
Examples of simulator exercises performed:

- Operating parameter analysis and anticipation of process upset.
- Managing slugs.
- Gas leakage to the flare.
- Production rate decrease.
- Partial loss of cooling water.
- Overpressure in storage tanks.
- Generation of several malfunctions (by the instructor) to be fixed.

MODULE 7: SAFETY IN OPERATION — 5 days

Routine operations: permit to work, safe isolation of plant equipment.
Downgraded situations. SIMOPS.
Learning to operate the plant in critical situation, to make adequate decision, to follow-up on actions performed:

- SIS: Process and emergency shutdown levels - Related Panel Operator role and duties.
- Emergency shutdown procedures.

Examples of simulator exercises performed: inhibition and downgraded situation mitigation (faulty pressure transmitter, SDV blocked open...); ESD activation due to process safety trip; manual ESD activation following leakage detection; emergency shutdown procedures implementation and follow-up (monitoring).

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Training - Applied chemical engineering for the refining and petrochemical industries

ACE-EN-P

Face-to-face only

52 days

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

Level

Knowledge

Public

Engineers interested in applied chemical engineering relating to Oil & Gas products, refining processes and polymers

Objectives

Attendees will be able to implement the following skills:

- master the main thermodynamics concepts encountered in industrial processes dealing with fluids and know in which case and how they can be simulated
- provide a better understanding of the supervision and optimized operation of industrial distillation units
- understand the practical meaning of fluids physico-chemical behavior as well as chemical reactions
- master the fundamentals on refining processes (general process scheme, technologies involved, range of operations, constraints, optimization criteria, economics)
- understand the technology and operating conditions of thermal equipment
- understand the operating conditions of rotating machinery
- improve the understanding of control instruments and problems related to their use
- be aware of the main potential technical dangers associated with various industrial processes and with the use of products
- get acquainted with the various safety, environment and quality global management systems, and of the various systematic techniques used to implement and monitor their application

Pedagogical & technical resources

- E-learning modules
- Many applications and case studies based on industrial experience
- Applications using process dynamic simulators (RSI IndissPlus simulator)
- Applications using static simulation software (PRO II)
- A refinery visit is organized to visualize some units during the Oleum trip
- A visit of a supermarket is organized to show the relation between the intrinsic properties of the polymer and the final application in packaging

Assessment of achievements

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

Prerequisites

A degree corresponding to 4 or 5 years of higher education, such as a French 'Diplôme d'ingénieur' (in 5 years),

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an American BSc (in 4 years), or another equivalent degree

Complementary informations

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

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

SEPARATION PROCESSES — 18 days

Applied thermodynamics:

- 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 and their application fields.
- Non-ideal mixtures, water-hydrocarbon mixtures.

Distillation:

- Overview on separation processes as an introduction on what will be seen in the refining, base chemicals and polymers processes.
- Parameters of industrial column operation: material balance, pressure, operation of liquid- vapor contact equipment, heat balance, reboiler and condenser operation, liquid-vapor flow rates, temperature and composition profiles.
- Distillation column process control: basic control, sensitive tray, variable and advanced control.
- Operation of multi-draw off columns, azeotropic and extractive distillation.

Distillation project:

- Introduction to the ProII/Provision simulation software with the help of an e learning module.
- Conception, design and cost estimation of a given industrial distillation column.

Instrumentation/Process control:

- Function and constitution of control loops and on/off control systems.
- Control loops: simple, cascade, split-range, calculated variables, feed forward.
- Main types of instruments, tags and symbols.
- Control valves: technology, safety position, intrinsic and real characteristics.
- Controllers: tuning, practice on dynamic simulator.
- Reaction run-away. Process control as an element of safety and quality.

FOUNDATIONS OF THE POLYMER INDUSTRY — 17.5 days

Industrial catalysts:

- Catalysis mechanism.
- Industrial catalysts properties.

Hydrocarbons physico-chemistry:

- Principal components of petroleum products.
- General hydrocarbon classification and main impurities.

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- Physical properties of hydrocarbon mixtures, correlations.

Crude Oils & Petroleum Products:

- Crude oils: analysis, average properties, yields in petroleum cuts, principal problems related to quality, classification.
- Petroleum products: classification, market, specifications, required quality for end use, new trends (biofuels, reformulated gasoline, ...).

Crude oil fractionation units:

- Crude oil desalting, atmospheric distillation, gas and gasoline separation. Vacuum distillation.

Refining Processes:

- Catalytic reforming and isomerization, hydrorefining processes, scrubbing treatments, catalytic cracking and alkylation, hydrocracking, thermal conversion processes, mineral lube base manufacturing processes.
- Economics of supply and refining operations.

Olefins and aromatics in petrochemicals:

- Overview of base chemicals and monomers manufacturing from chemistry to polymers.
- Sources, outlets and main industrial uses of olefinic and aromatic intermediates.
- Steam cracking and treatment of the cuts produced.
- View of the different schemes available, how to choose the correct one for design.

Synergy: an opportunity for the refining and petrochemical industries:

- Understand the synergy between Refining and Petrochemicals.
- Identify opportunities – existing units vs new designs.

For each process of monomers manufacturing:

- Basic chemistry.
- The main steps of the industrial process(es), description of the industrial plant(s).
- Technical evolution of the process(es).
- Product specifications.
- Main producers, trends of the market, economics.

On-Purpose Olefins:

- Overview of the main “on-purpose” technologies and related processes: FCC propylene, ethanol dehydration, propane dehydrogenation, ethylene + butene-2 metathesis, MTO-OCP, MTP.

Introduction to Polymer Chemistry and Characterization:

- Polymer structure - Conformation / Properties relationships.
- Characterization methods relevant to industrial polymerization: molecular weight distribution, melt index, intrinsic viscosity, Nuclear Magnetic Resonance, Gel Permeation Chromatography, light scattering.

FLUID TRANSPORT AND HEAT TRANSFER EQUIPMENT 10.5 days

Heat Transfer:

- Conduction and convection: parameters affecting heat exchange, resistance caused by the walls and by fouling, calculation methods.
- Radiation: emission, absorption, application to furnaces and boilers, tube skin temperature, influence of fuel burned, fouling effects.

Heat Exchangers:

- Functions, classification, TEMA standard nomenclature.
- Selection criteria for different types of shells and front and rear ends, principles of heat exchanger sizing.
- Variation in performance as a function of changes in operating conditions.

Furnaces boilers:

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- Different types of furnaces and functions, operating conditions, furnace efficiency and energy recovery.
- Combustion phenomena, distribution of supplied heat.
- Burners: fuel, air supply and mixture.
- Air and flue gas circulation: natural draft, forced draft.
- Simulations on furnaces operations.

Fluids dynamic:

- Liquid flow in a line, volume and mass flow, circuit characteristics.
- Pressure, pressure drops calculation in the lines and accessories.

Rotating machinery:

- Centrifugal and volumetric pumps: main types, technology, maintenance, specifications.
- Reciprocating and centrifugal compressors: main types, operating conditions, technology.

OPERATIONS, ENVIRONMENT, RISK MANAGEMENT & PROCESS SAFETY — 6 days

Safety intro & integrated management systems:

- Structure of an integrated management system.
- Commitment and responsibilities of plant management staff.
- Sharing the integrated management system responsibilities.
- Communication requirements.

Risk Management & Process Safety:

- Definition of risk.
- Introduction to process safety (hazard potential, scenarios).
- Historical major accidents.
- Inherent safe design principles.
- Hazard identification techniques.
- Layer of protection analysis.
- Safety critical measures.
- Plant site layout development.

Introduction to industrial polymer processes:

- Some historical milestones, importance of plastics in today's world, nomenclature.
- Main polymerization reactions and processes.
- Main industrial problems (impurities, heat removal, fouling, run-away, polymer recovery and finishing, change-over between grades, ...).
- Methodology for polymer process development.

Sessions

Rueil-Malmaison - From 09/01/2026 to 11/27/2026 — **19500 €/HT**

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Training - Financial Management in the Energy Business

AGFE-EN-P | Face-to-face only | 3 days

The energy sector is changing. The energy transition is increasing the pressure on traditional Oil & Gas activities' profitability. Renewable energy value levers are changing rapidly. In this context it is important for managers of these activities to understand the stakes of the firm's financial management and its key tools in order to better contribute to the performance of their organization

Level

Knowledge

Public

Technical, business development executives, economists and young high-potential executives of Oil & Gas and renewable energy companies, as well as public administration decision makers and staff (industry, finance, energy, environment)

Objectives

Attendees will be able to implement the following skills:

- Interpret the main financial indicators of their organization to better contribute to value creation,
- Evaluate the expected profitability of investment projects,
- Understand the criteria for selecting a company's financial structure

Pedagogical & technical resources

- Exercises.
- Case studies: financial analysis of a company, evaluation of an investment project (offshore Wind farm)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

DEFINITIONS — 0.6 day

Financial management objectives. Key performance indicators in the energy sector.
Understanding financial statements. Fundamental accounting principles. Difference between income statement and cash flow.

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VALUE MANAGEMENT — 1.7 days

Analyzing and managing the financial performance of operations. Energy companies management targets/objectives: "Total Shareholder Return", ROCE, ROE). Cost of capital. Financial analysis ratios. Dashboards. Assessing the profitability of an investment project: discounting methodology and economic indicators (NPV, IRR, Payback time...), sensitivities.

OPTIMIZING THE FINANCIAL STRUCTURE OF THE FIRM — 0.7 day

Choosing the financial structure of the firm. Gearing.
Solvability, borrowing capacity.
Examples of typical energy financing methods: project financing, green bonds.

Sessions

Rueil-Malmaison - From 10/13/2026 to 10/15/2026 **2970 €/HT**

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Training - Process Energy Efficiency Improvement for Industrial Plants

AMENER-EN-P | Face-to-face only | 3 days

This course provides comprehensive and applied knowledge of pinch analysis and covers how to improve energy efficiency in existing plants or new projects

Level

Expert

Public

Engineers from process, engineering, R&D departments of industrial plants in various industries (oil, gas, petrochemical, chemical, energy, paper, food, etc.)

Objectives

Attendees will be able to implement the following skills:

- List the energy efficiency improvement methods
- Carry out an energy efficiency analysis on a simple process

Pedagogical & technical resources

- Practical course and case studies based on industrial data and adjustable to trainee's concern
- Use of an expert software to compare to the initial evaluation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENERGY EFFICIENCY & CONTEXT — 0.5 day

Definition of Key Performance Indicators: energy intensity and efficiency, units and use.
Motivations and constraints: energy dependence and regulation.
Different approaches for energy efficiency: operation improvement, operating conditions optimization and other significant improvement solutions (pinch analysis, alternative technology, process design, best available techniques).

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PINCH ANALYSIS & MAIN RULES — 0.5 day

Temperature Interval Method (TIM) and PINCH Method.
Composite curves (hot and cold streams): building, description and interest.
Pinch point: characteristics and help for solutions design. Key parameters: ΔTmin, integration ratio.
Main rules: “cross pinch”, “plus or minus principle”,...
Illustration through examples.
Advantage of an expert software dedicated to energy analyses.

METHODOLOGY FOR ENERGY ANALYSIS: MAIN STEPS & CASE STUDIES — 2 days

Several case studies proposed and based on a methodology for energy analysis, adapted for industrial plants or new projects.
At this step, trainees will be able to:

- Characterize the energy needs and potential of a process.
- Design the most consuming pieces of equipment.
- Define savings targets.
- Propose potential solutions and options.
- Simplify it in order to select most profitable and operational options.

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Training - Air Separation Unit

ASU-EN-P | Face-to-face only | 3 days

This course reminds the basic background and knowledge of Air Separation Unit technology and operation

Level
Skilled

Public
Operators, supervisors and plant managers involved in operation and optimization, technicians support, process engineers, process control engineers and safety personnel

Objectives
Attendees will be able to implement the following skills:

- Describe the main equipment associated with the Air Separation Unit and their function
- Explain the operating parameters and the product management for safe operation
- Detect abnormal situations by troubleshooting and implement preventive measures

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PRINCIPLES OF AIR SEPARATION UNIT — 0.5 day

Overview on the air separation technology along the relevant process units:

- Introduction to air separation technology.
- Basics of the separation process.

PROCESS UNIT DETAILS, DESCRIPTION, TECHNOLOGY & OPERATING PARAMETERS — 1.5 days

Air filtration system.
Air compression.
Pre-cooling system.
Front end purification.
Brazed alumina heat exchanger.

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Distillation columns.
Vapor/condenser.
Cryogenic pumps/expander.
Storage and backup vaporization.

THE SPECIFIC RISK OF OXYGEN/NITROGEN — 0.5 day

Introduces to oxygen risk, reactivity of material with oxygen, design of O2 installation.
Review of incidents in air separation units, causes and preventive measures.
Safe operation and maintenance of equipment.
Anoxia, deficient atmosphere.

BASIC CONTROL PRINCIPLE — 0.5 day

Main control loops.
Safety loops, elements important for safety.
Transition phase: start-up, load change, shutdown.

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This training course is offered under the **Alliance4Training** brand

Training - Field Safety Audit

AUDSECU-EN-P | **Face-to-face only** | **2 days**

This course provides techniques to employees in order to improve human behavior during field safety assessments of various activities on site

Level

Knowledge

Public

Site's employees and contractors (SHE, operation, maintenance, projects, laboratory...)

Objectives

Attendees will be able to implement the following skills:

- Explain the role of the audit in the site's security approach
- Specify the elements of design, conduct and effective management of a field audit

Pedagogical & technical resources

- Teamwork with case studies, incident analysis, simulations and role-playing
- Real site audits (according to site's opportunities) and reports writing
- Site audits debrief: analyzes/exchanges on the different situations met

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FIELD SAFETY AUDIT AS A MAJOR TOOL FROM SAFETY MANAGEMENT — 0.5 day

Management commitment regarding safety:

- Apply and enforce site's Safety policy.
- Be exemplary in your behavior.
- Be vigilant and reactive to the situations encountered, avoid routine, and develop proactivity.

Safety results and performance improvements:

- Risk pyramid: accident, near miss, hazardous situation & hazardous acts, occupational illness.

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- Main focuses for field audit.

Objectives and benefits of audits:

- Assess site's staff involvement regarding Safety.
- Correct hazardous situations & acts (immediate and / or planed actions).
- Continually look for improvements.
- Develop critical thinking, avoid routine phenomenon

FIELD SAFETY AUDIT PROCESS 0.75 day

Different steps:

- Preparation for the visit.
- Field visit: observation, information gathering, verbal communication, finding solutions.
- Post-visit: information processing, writing of the report, communication of the results, action plan, follow-up of the action plan, feedback to the people observed.

Communication techniques before, during and after the audit:

- Contact with people observed.
- Active listening.
- Dialogue.
- Communication of the results: validation, assessment of safety level.

Observation techniques:

- Observation cycle: decide, stop, observe, act, report, and follow.
- Observing man at work.
- Observing work environment: equipment integrity, protections, safety rules, procedures, order and cleanliness, work permit.
- Examples of guide sheets.

PRACTICAL EXERCISES WITH FIELD SAFETY AUDITS BY TRAINEES 0.75 day

Targeting of the audit: location, activity, persons...
Performing field safety audit with associated behavior and communication.
Report writing with facts observed, immediate actions and proposals for improvement.
Audit report presentation to the group and discussion.
Use of specific audit procedure and guidelines from the site.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Fuel Manufacturing - In Line Blending Optimization

AUTOOFF-EN-P | **Face-to-face only** | **3 days**

This course provides a thorough understanding of the product manufacturing principles: in line blending monitored by a global optimizer

Level

Skilled

Public

Engineers, managers, technical and operating staff interested or involved in product manufacturing

Objectives

Attendees will be able to implement the following skills:

- List the standard tests relating to the specifications of gasoline, diesel and fuel oil mixtures, specifying the impact of each of the bases on each property
- Explain the working principle of the application of mixtures taking into account the associated laws and their limits
- List the sources of possible malfunctions of the application and, after analysis, the necessary corrective measures

Pedagogical & technical resources

Training content is fully adapted to the refinery blending optimization tool, which is done under confidentiality agreement

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer, including blended simulations
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GASOLINES, DIESEL FUELS, HEAVY FUELS SPECIFICATIONS — 0.5 day

Normalized tests used to check specifications.
Specifications: main constraints for the optimizer.
Optimization of the blend: notion of give-away and identification of the key constraints.

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BASES & ADDITIVES — 0.25 day

Nature, origin and characteristics of the bases.
Additives: best practices for additivation - Properties optimized by additives.

BLENDING LAWS USED BY THE OPTIMIZER — 0.75 day

Density, octane numbers, cetane numbers, vapor pressure, distillation, cloud point, flash point, viscosities, sulfur.
Analyzers: principle; sampling loop; Tank Quality Integration (TQI).
Particular case of properties optimized by additives (case of CFPP for Diesel fuel).

BLEND OPTIMIZATION: SP95 & ADO MANUFACTURING — 0.75 day

Check of base properties - The optimizer requires all the base properties.
Ratio constraints due to inventory constraints.
Quality constraints (specifications).
Economic optimum.
Follow up of the blending with the main process view of the application.

BLEND MONITORING — 0.5 day

Different steps in the calculation of the optimizer - Dynamic optimization of the application.
Algorithm principle: integration cycles, optimization cycles, dynamic regulation.
Blend manufacturing: how to treat infeasibilities.

UPSETS - STUDY CASES — 0.25 day

Often result from wrong inputs. Identification of the origin of the problem and corrective measures.
Switch of the optimizer in “model mode” in case of analyzer failures during the blend.

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Training - Production Accounting and Material Balance

BILMAT-EN-P | Face-to-face only | 3 days

This course provides the fundamental knowledge for understanding production balance, linking relevant operations and production figures which impact issues such as transfer fee, exchange between fields, field use...

Level

Knowledge

Public

Managers, engineers, technical or non-technical staff involved in production reporting or material balance handling (assessing fee, value created, etc.)

Objectives

Attendees will be able to implement the following skills:

- Establish production balance from basic data (well tests, process measurements, fiscal data)
- Explain performance monitoring mechanisms and production reporting tools
- Describe accounting and back allocation rules specific to process or production mode

Pedagogical & technical resources

- Highly interactive and applied course by industry specialist lecturers
- Numerous illustrations and cases studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

THE PRODUCTION CHAIN FROM THE RESERVOIR TO THE EXPORT POINT — 0.5 day

Field operations mapping.
Nature and characteristics of fluids accounted for.
Field processing of well effluent: surface facilities.
BFD studies.

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MEASURES & METERING SYSTEMS ALONG THE CHAIN — 0.5 day

Well measurements and production tests.
Metering systems and their location in the plant:

- Technology, accuracy, calibration.
- “Filter” concept of a metering system.
- Process metering.
- Transactional metering.

Tank gauging.

LIQUID & GAS BALANCES — 1.25 days

Production accounting rules.
PFD studies of Oil & Gas treatment units.
Liquid balances: oil balance, condensate balance, LPG balance, water balance.
Gas balances: dry gas and wet gas field cases.
Case studies:

- Study of oil and condensate balances.
- Reconstruction of a natural gas and associated gas balance (Oil & Gas cap ring).

PERFORMANCE MONITORING & PRODUCTION REPORTING — 0.25 day

CASE STUDY & PRODUCTION BALANCES RECONSTRUCTION: BACK ALLOCATION, SATELLITE FIELDS, MAIN PRODUCTION CENTERS — 0.5 day

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Training - Boilers Safe Operation and Optimization

BOILER-EN-P | **Face-to-face only** | **4 days**

This course provides in-depth knowledge of boilers operating conditions and constraints for a safe and reliable operation

Level

Skilled

Public

- Operators, panel operators, supervisors and plant managers involved in steam production facilities operation and optimization
- Maintenance, instrumentation technicians and supervisors working on boilers

Objectives

Attendees will be able to implement the following skills:

- Describe the main types of industrial boilers and their components, including their operating conditions
- Explain how the main control loops work
- List the main phases of a safe boot procedure

Pedagogical & technical resources

- Use of case studies or exercises based on actual cases from the industry
- Special emphasis on safety issues and abnormal situations that can lead to accidents

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BOILER DESCRIPTION & OPERATING CONDITIONS — 0.75 day

Different types of boilers and their characteristics. Operating conditions. Fuel consumption. Distribution of the heat supply as a function of the steam pressure and temperature. Construction of the vaporization and superheating tube bundles, the economizer and the drum.
Application: calculation of heat distribution between water wall, superheaters, economizer and air preheater.

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COMBUSTION - BURNERS — 1.5 days

Combustion conditions: fuel characteristics.
Conventional and low NOx burner technology and operation.
Combustion quality: analysis of oxygen and unburned material in the flue gases.
Safe combustion: flame detection, control and safety devices on the fuel circuits.
Air and flue gas circulation. Flue gas pressure profile in the boiler, draft control.
Application: flue gas composition calculation, air and flue gas pressure profile drawing.

STEAM PRODUCTION — 0.75 day

Water preparation: drawbacks arising from the impurities in the water, water quality measurement, characteristics of feed water and water in the boiler, thermal degassing, water chemical conditioning.
Control loop systems: steam pressure, feed water flow rate, superheated steam temperature, disruptions and control principles.

BOILER OPERATION — 1 day

Steam generation inside tube coil and steam superheating.
Heat flux, parameters influencing heat transfer, impact of fuel type, fouling impact.
On-stream boiler operations: routine monitoring, operating condition changes, analysis of disturbances, soot blowers, drains, etc.
Start-up and shutdown: preparation, ignition procedures, pressure build-up, connection to network, normal or emergency shutdown.
Application: study of start-up and shutdown procedure. Accident case studies.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Field Operator

BOINT-EN-P | **Face-to-face only** | **60 days**

This course provides the knowledge and know-how for the specific field operator position. Successful participants will be granted the “Field Operator” IFP Training Vocational Certificate

IFP Training Certificate

Vocational Certificate

Level

Knowledge

Public

Newly recruited operators in the refining, petrochemical and chemical industries

Objectives

Attendees will be able to implement the following skills:

- Monitor the facilities in an autonomous way, in compliance with Safety and Environmental rules
- Safely perform all routine operations related to operator duties, as well as the key non-routine ones
- Identify equipment deficiencies, explain their root causes, and take appropriate action
- Communicate effectively with their colleagues

Pedagogical & technical resources

- The training program is structured by alternating: Classroom training (2-week sessions) including theoretical and practical courses and On-the-Job training (typically 1-month sessions) 100% on-site, in their facilities, with instructors' help
- Even during classroom training, lots of practical exercises and applications
- Instructors having extensive Oil & Gas downstream experience, helped by company mentors
- Continuous assessment completed by a final exam in front of a jury)

Assessment of achievements

Continuous assessment

Prerequisites

Having already been pre-recruited by an Oil & Gas company
Although not mandatory, a technical education is desirable

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CLASSROOM TRAINING (THEORETICAL & PRACTICAL) — 55 days

Professional basic training:

- Physical parameters; liquid vapor equilibria notions; fluid flow; heat transmission.

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- Chemistry: basic notions, industrial chemical reactions.

Products and processes:

- Quality tests, specifications; sampling safety procedures; refining processes; safety aspects.
- Storage tanks, reception and expedition facilities; utilities; environmental protection; energy.

Equipment operation and safety:

- Pressure vessels (columns, drums, reactors) description and operation.
- Rotating equipment (centrifugal and positive displacement pumps, compressors, steam turbines, electric motors).
- Thermal equipment (heat exchangers, furnaces, boilers).
- Instruments (sensors/actuators), process control.

Safety in plant operation.

ON-THE-JOB TRAINING

Presentation, initial recommendations and safety instructions:

- General technical information: presentation of the refinery, main feeds and products.
- Safety: safety rules, specific instructions, control and protection, prevention, fire extinction exercises.
- Injury and life protection: preparation of rescuer degree.

General training on the job:

- On different production units: equipment identification; operation follow-up.
- Identification of operator tasks, responsibilities of each member on the shift team.

Specific job position study:

- Process, feeds and product characteristics, circuits.
- Equipment field control; safety; operational instructions, procedures.

Controlled practice in job position:

- Achievement of the various tasks involved in the job, under control of the assigned people on the shift team.

KNOWLEDGE ASSESSMENT 5 days

Continuous assessment during training modules. Final written exam at the end of the theoretical training.
Rating of practical exercises and on-the-job trainings, based on presentations and written reports.
Personal job-based final report, describing assigned unit and operator day-to-day activities, rated.
Final examination to confirm proficiency (knowledge of circuits, equipment and processes, job practice).

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Training - Refining Processes and Petroleum Products

BRP-EN-P | Face-to-face only | 5 days

This course provides a broad technical information on refining processes and units, in order to understand a manufacturing scheme in relation with the qualities of the products

Level

Knowledge

Public

Professionals in the Oil & Gas industry (engineers, technicians...) or related sectors (in the technical, commercial, legal, finance, or HR departments) interested in oil refining

Objectives

Attendees will be able to implement the following skills:

- describe the composition, main characteristics and new trends of petroleum products
- explain the role of various processing units in a refinery
- describe the main manufacturing schemes encountered in oil refining
- acquire and use a common vocabulary with interlocutors in the oil services sector

Pedagogical & technical resources

- Detailed course material with a glossary of the main technical terms used in the refining industry
- Active participation of trainees through interactive games and quizzes to grasp the key points of the course

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PETROLEUM STATISTICS — 0.25 day

Evolution of the structure of the Crude market and the characteristics of petroleum products on a European and global scale. Biofuels in formulations.

PETROLEUM PRODUCTS — 1 day

Principal components of petroleum products; general hydrocarbon classification and main impurities (sulfur,

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nitrogen, metals and asphaltenes, etc.).
Quality requirements for petroleum products regarding their utilization: quality specifications measured by standard tests, characteristics related to the product composition.

REFINING PROCESSES — 3.5 days

Crude oil fractionation

- Origin, overall characteristics and classification of crude oils.
- Yields and properties of straight-run cuts obtained by distillation, potential destinations.
- Industrial units: atmospheric distillation, vacuum distillation, light-ends fractionation.
- Typical process scheme, operating conditions.

Catalytic reforming and isomerization

- Octane improvement of virgin naphthas.
- Basics of processes, types of catalyst, product yields and hydrogen production.
- Industrial units: process flowsheets, operating conditions, equipment, low pressure processes.

Hydrorefining processes

- Main features of impurities removal by catalytic hydrogen treatment.
- Main refining applications.
- Example of ULSD hydrotreatment unit: operating principles, operating conditions.
- Sulfur recovery unit: amine washing, sulfur production, Tail gas treatment from Claus units.

Conversion units

- Outline of conversion and various cracking processes.
- Characteristics and origin of feeds for cracking.
- Conversion by means of thermal cracking: visbreaker, various cokers.
- Conversion by means of catalytic cracking: FCC and related units, gasoline sweetening and desulfurization, alkylation, production of ethers and propylene, hydrocracker and related units, hydrogen production (SMR, POX).
- Developments in hydrotreatment and hydroconversion of heavy residues.

Evolution of feeds and processes

- Co-processing
- Bio-refineries

MANUFACTURING FLOWSHEETS — 0.25 day

Main routes to major products.
Up to date refining schemes including the production of petrochemical intermediate products.
Impacts of the evolution of market demand and the quality of the products on manufacturing patterns.
Base lube oil manufacturing.

Sessions

Rueil-Malmaison - From 12/14/2026 to 12/18/2026 — **3440 €/HT**

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Training - Current and future fuels

CARBU-EN-P | Face-to-face only | 3 days

This training allows you to follow the evolution of fuels, which is strongly linked to the reduction of polluting emissions from transport. It will give a global vision of fuels from conventional fossil fuels to e-fuels, including biofuels

Level

Expert

Public

Executives, engineers and technicians in the automotive, refining, petroleum products or agrofuels trading industries, concerned by the evolution of fuel quality, in relation to the technologies applied to engines

Objectives

Attendees will be able to implement the following skills:

- Identify the different energies available and necessary for mobility
- List the key properties of current and future land, sea and air fuels
- Understanding the influence of fuel composition and manufacturing on emissions

Pedagogical & technical resources

An interactive pedagogy in the form of exchanges with the group, activities that allow the concepts presented to be quickly integrated

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CONTEXT, ISSUES, REGULATIONS AND DEFINITIONS — 0.5 day

Global warming.
Regulatory frameworks (COP-RED – International – European – French).
Environmental assessment from well to wheel.
Definitions: carbon footprint, carbon intensity, LCA, certificates, biofuels, e-fuels-RFNBO.

BIOFUELS FOR GASOLINE ENGINES — 0.75 day

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Properties sought for gasoline: volatility, combustion, toxicity, corrosiveness, stability.
Exhaust pollution: origin and composition of emissions.
Composition and methods of manufacture of current gasolines.
Resources and production processes of renewable fuels and use. Contribution of new biofuels to the reduction of CO2 emissions from vehicles:

- Biofuels for gasoline engines: Ethanol and ETBE.
- Hydrogen: use as such or fuel cell for electric cars.

Comparison between these different fuels.

BIOFUELS FOR DIESEL ENGINES 1 day

Properties sought for diesel: combustion, resistance to low temperatures, composition.
Pollution by diesel engine exhaust: particulates, NOx.
Composition and formulation of engine diesel.
Resources and production channels of renewable diesel fuels and use. Contribution of new biofuels to the reduction of CO2 emissions from vehicles:

- Biofuels for diesel engines: FAME fatty acid esters and HVO hydrogenated oils.
- BTL second-generation diesel biofuels.
- Hydrogen: Fisher Tropsch or e-fuel.
- Use of other dual-fuel fuels for marine fuels: Methanol, Ammonia, LNG.

Comparison between these different fuels.

BIOFUELS FOR JET 0.5 day

Properties of JET – The emissions of JET into the air.
Composition and manufacture of fossil JET in the refining scheme.
Biofuels for turbines (aeronautics):

- Main production routes certified or in the process of certification of Biojet fuels: hydrotreated vegetable oils, synthetic biojets, biological routes.

E-fuel for aviation:

- Impact of new fuels on logistics, aircraft and turbine operation.

SUMMARY OF THE DIFFERENT ALTERNATIVE FUELS 0.25 day

Summary of fuels used in:

- Petrol engines.
- Diesel engines.
- Marine engines.
- Turbines for aeronautics.

Group activity.
Conclusion and answers to questions.

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This training course is offered under the **Alliance4Training** brand

Training - Operation of a Binary Distillation Column - Level 2

CCDSS-EN-P | **Face-to-face only** | **5 days**

This course provides a deeper understanding of operating distillation columns under all conditions, with a practical understanding of operations and control systems through a hands-on experience

Level

Skilled

Public

Console operators and production supervisors, shift supervisors involved in the operation of distillation column

Objectives

Attendees will be able to implement the following skills:

- Give the meaning of driving parameters
- List the different regulatory systems,
- Identify their advantages and disadvantages in response to disruptions
- Logically present the main steps of stopping and starting a column

Pedagogical & technical resources

- Highly efficient learning process: use of a virtual column modeled on CORYS IndissPlus dynamic simulators
- Exercises are conducted in small groups of 2 to 3 participants, each group operating its own virtual column. Each exercise includes: a pre-discussion of the problem; definition of the target exercise objective; adequate time to run the virtual columns; open analysis of the results, shared with all participants; and practical conclusions related to the operation of the columns
- Attendees are invited to bring descriptions of their specific column control strategies for group discussion and analysis. Conclusions drawn from the exercises on the simulator can be transposed to other actual control schemes
- The content of the exercises can be customized to the needs and specific features of the client site
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

OPERATING PARAMETERS — 1 day

Behavior of flash mixtures: vaporized fraction, liquid-vapor separation and distribution of components according to their volatility.
Material balance of the column: concepts of cut point, separation quality and fractionation capability.
Heat balance: reflux and reboiling ratios and selectivity assessment.
Column pressure effects: pressure control and pressure profile along the column - Flow rates, concentration and temperature profiles.

FRACTIONATION CAPABILITY — 0.5 day

The trainees will experience these causes and effects on a debutanizer simulator.
Effects of liquid-vapor flow rates, reflux and reboiling ratios on separation - Influence of liquid-vapor traffic on concentration and temperature profiles.
Position of inlet tray.
Fractionation capability and its relationship to energy consumption.

MASS BALANCE & IMPLEMENTATION OF A TEMPERATURE CONTROL — 0.5 day

Impact of reflux and reboiler duty on material balance, and consequences on product specifications.
Impact of disturbances on column mass balance and product purities.
Definition of and how to identify the sensitive tray, and its influence on concentration profiles and products qualities.
Implementation of sensitive temperature control systems, advantages and limitations.

OTHER PROCESS CONTROL PARAMETERS — 1.5 days

Survey of operating disturbances, their common origins and causes - Pressure control and its impact on column stability.
Analysis of disturbances caused by the feed, composition, temperature or flow rate.
Reboiler fouling, loss of condensing, and tray flooding - External and internal reflux control, and reboiling control by means of flowrates or duty.
Optimizing heat balance, influence of additional energy through feed or reboiler, and benefits of low pressure operation.
Implementation of control systems based on quality measurement.

UPSETS — 1 day

Operation of the column at its limits: thermal equipment fouling, cooling water troubles and flooding - Failures of instruments and pumps.

START-UP - SHUTDOWN — 0.5 day

Analysis of the behavior in the column at each step of start-up and shutdown.

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Training - Centrifugal compressors and steam turbines

CCTAV-EN-P | Face-to-face only | 4 days

This course provides a clear understanding of the performance and technology of these types of equipment

Level
Expert

Public
Graduate engineers, new engineers and staff supervisors from the maintenance, process or operation department of refineries and petrochemical plants

Objectives
Attendees will be able to implement the following skills:

- Explain the operation of centrifugal and axial compressors, steam turbines and expanders
- List the essential elements for the sizing and selection of a centrifugal compressor or a steam turbine
- List potential incidents encountered on these machines

Pedagogical & technical resources

- Extensive use of digital applications related to industrial equipment
- Interactive course
- Specific, detailed and high level documentation
- Use of a dynamic simulator (centrifugal compressor + steam turbine)

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GAS COMPRESSION & EXPANSION — 1 day

Gas laws, isentropic, polytropic compression; mass and volume flowrate.
Gas compression calculations: discharge temperature, compression work and power.
Mollier diagram for steam. Steam work and power.
Centrifugal compression and steam expansion mechansim: Euler law, Velocities triangle.
Steam Expansion modes: Impulse, reaction, twisted blades.
Affinity laws and calculations. Head and flow coefficients.

COMPRESSORS, TURBINES & EXPANDERS PERFORMANCE & OPERATION — 2 days

Axial and centrifugal compressors:

- Performance curves.

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- Aerodynamical operating limits _ Surge and stonewall, operating range.
- Flow control methods. Anti Surge control systems.
- Start-up and shutdown: key points.

Steam turbines:

- Turbine performances: rotation speed range, steam consumption, efficiency.
- Turbine performance vs inlet and exhaust conditions.
- Steam turbine governors. Control systems. Protection against overspeed.

Turbo-expanders:

- Technology and main uses.
- Safety devices.

TECHNOLOGY & ENGINEERING ASPECTS OF COMPRESSORS & TURBINES — 1 day

Technology:

- Casings, diaphragms, stator, blades.
- Rotor, journal and thrust bearings, internal and shaft seals, coupling.
- Balancing and critical speeds. Lubrication and seal systems. Standard mechanical failures.
- Machine monitoring: vibrations, oil temperature,...

Engineering:

- API specifications. Information required for bidding. Factory acceptance tests.

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Training - Carbon Capture, Utilization and Storage (CCUS)

CCUS-EN-P | Face-to-face only | 3 days

The purpose of this training course is to give to the participants a better understanding of the CCUS technology various aspects from CO2 capture to storage and reuse

Level

Knowledge

Public

Technicians/engineers and decision makers working in industries that target CO2 emissions reduction and CCUS in their road map

Objectives

Attendees will be able to implement the following skills:

- Identify CCUS interest in the energy transition
- Understand the different technical bricks

Pedagogical & technical resources

- Training materials, videos
- Practical exercices ans study case
- Discussions with the audience

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PRESENTATION OF THE CCUS VALUE CHAIN — 0.25 day

Context: CCUS's share of emissions reductions.
Economics of CCUS projects: cost of each item.
Overview of current achievements.

CO2 TREATMENT AND STORAGE — 0.75 day

Physicochemical properties of CO2.

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CO2 transport: pipeline, truck, sea, train, ...
CO2 compression: by compressor or pump.
Terrestrial and geological storage.

CO2 CAPTURE — 1.5 days

Capture technologies (post-combustion, pre-combustion, oxy-combustion, industrial processes).
Process diagram – main operating conditions.
Comparison of the different technologies.
Project status.

CO2 USES — 0.5 day

Direct use: food.
Syngas production (RWGS) enabling synthesis of:

- Fuels.
- Methanol.
- Petrochemicals intermediates.

Sessions

Rueil-Malmaison - From 11/17/2026 to 11/19/2026 — **3020 €/HT**

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Training - Refining and Petrochemicals Operations Shift Supervisor

CDQRC-EN-P | **Face-to-face only** | **10 days**

Develop and reinforce operations team management skills

Level
Skilled

Public
People planned to be assigned to a new position as operations shift supervisor or team leader

Objectives
Attendees will be able to implement the following skills:

- Clarify the responsibilities of a shift supervisor and those of other team members
- List the elements of management of the operations of their sector during and outside business hours
- List the points of a relevant communication according to the interlocutors concerned
- Clarify the rights and duties of a shift supervisor with respect to safety

Pedagogical & technical resources

- Interactive delivery method with intensive feedback/sharing from participants' knowledge and experience
- Team work on different exercises and real incident case studies
- Feedback analysis of selected real accidents
- Role playing simulation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ROLES & RESPONSIBILITIES WITHIN SITE ORGANIZATION — 2 days

Site's rules and procedures daily field application. HSE objectives and equipment integrity ownership.
Basic tools used at operations shift supervisor's position: risk analysis, incident report, management of change...
Commitment and implementation for new site's initiatives.

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DAILY PLANT AREA MANAGEMENT — 4 days

Potential problems: risk underestimation, interfaces and procedures improperly managed, requirements/field presence less than adequate.
Plant operations from the field: housekeeping, routine activity follow-up, information reporting from outside and panel operators, sampling and analysis results usage, equipment integrity, operational issues reporting within site organization.
Plant supervision from the panel: respect of operating windows and safety devices, (un)validation of abnormal situations, anticipation of potential impacts on other plant areas, utilities and water treatment. Monitoring of consumptions, atmospheric and water effluents. Operating cost reduction and economical optimization impact.
Interfaces with other services: procedures writing/validation, equipment (de)commissioning, permit to work validation and field activity follow-up. Products swaps between areas, product reception and shipping activities with third parties.
Specific operations management: abnormal operations, special operations, emergency response.

DAILY TEAM MANAGEMENT — 4 days

Human behavior: information quality, workload management, individuals' and team's motivation.
Activity organization: shift handover, information sharing, planning and priorities management. Task request, delegation and controls.
Team meeting: organization, preparation, progression, deliverables and follow-up. Lessons learned, safety toolbox, best practices...
Operational problems solving: listing facts, brainstorming, decision making.
Up & down communication: relations with different persons. Solving dispute issues within the team.
Operational budget administration: responsibilities, regulation and usual risks.
Commitment regarding HSE approach, reacting to unsafe acts and conditions, enforcing safety rules. Continuous improvement.
Individual and team motivation: achievable targets (HSEQ, reliability, profitability...). Exemplary behavior, commitment and proactivity. Individual yearly appraisal, coaching, training.
Auto-evaluation of one's own behavior: leadership, communication and motivation/warning to employees, information sharing.

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Training - Economic Framework of Petrochemicals

CEP-EN-P | Face-to-face only | 3 days

This course allows the participants to deepen their knowledge on the petrochemicals sectors and to assess the main economic challenges in these sectors

Level
Knowledge

Public
All professionals wishing to improve their understanding of the functioning of petrochemicals industry

Objectives
Attendees will be able to implement the following skills:

- Understand the economic framework and the key challenges of petrochemicals industry
- Identify key interfaces between petrochemicals and other hydrocarbon sectors such as upstream (Oil & Gas) and downstream value chain (refining/petrochemicals)

Pedagogical & technical resources
Case studies and exercises in groups

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENVIRONMENT FRAMEWORK & UPSTREAM PETROCHEMICALS — 1 day

Industry fundamentals: from coal/oil/gas to petrochemicals and global/regional outlook.
Petrochemicals: key building blocks processes:

- Olefins (C2, C3, C4).
- Aromatics (benzene, paraxylene).
- and associated traditional technologies (steamcracker, FCC, reforming...).

Steamcracker economics:

- World/regional capacities.
- Typical yields and cost of production (methodology and comparison).

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- Petrochemicals: opportunities (shale gas) and challenges (climate change, capex, shale gas...).

Case study: optimization of steamcracker feedstock, steam cracker margin/income.

OLEFINS (C2=/C3=) 0.75 day

Review of processes (cracker and FCC) and new technology (MTO, CTO, PDH...).
Key players and market perspectives (new investments).
Sector challenges (production increase, production costs...).

C4 & AROMATICS 0.25 day

C4 value chain (butadiene and butylenes), brief technical review of technologies, key actors and markets.
C5 value chain (isoprene, DCPD, PIPS).

INVESTMENT PROFITABILITY STUDIES 1 day

Value creation and capital cost, cash flows, discounting principle and inflation impact.
Standard global profitability analysis: cash flow schedule, economic criteria (net present value, internal rate of return, etc.).
Introduction to risk analysis.
Case study: steamcracker profitability.

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Training - Economic Framework of Refining

CER-EN-P | Face-to-face only | 5 days

This course provides a complete view of all the fundamental aspects and challenges of the economic framework in which the refining industry is evolving

Level

Knowledge

Public

Technical, operating and engineering personnel working in the refining industry, trading and commercial specialists, independent consultants, process licensors, catalyst manufacturers and refining subcontractors

Objectives

Attendees will be able to implement the following skills:

- Calculate product marginal value, refinery margins and process unit margins
- Simulate refinery operations and product blending
- Analyze the result of a linear programming model optimization
- Evaluate project profitability

Pedagogical & technical resources

- Case studies and exercises derived from present refinery situations
- Economic optimization using Excel
- Quiz

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNICAL OVERVIEW — 0.25 day

Brief technical presentation of the main refining units: distillation, conversion, blending, etc.
Refinery scheme evolution.

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OIL MARKETS & TRADING — 0.75 day

Oil supply and demand fundamentals and evolution.
Petroleum physical trading (spot, forward).
Crude oil and petroleum product pricing: benchmark, quality differential, etc.
Financial trading (futures) and hedging strategies for a refiner.

REFINING CONTEXT — 1 day

World petroleum product demand.
Refining supply: overcapacity, types and quantity.
Main challenges: deep conversion, new product specifications, petrochemical integration, environment, etc.
Projects and perspectives.

REFINING MARGINS & COSTS — 0.75 day

Refinery margins and costs: definitions and evolution worldwide.
Unit margins and intermediate product valuation.
Case studies: crude oil arbitrage, Fluid Catalytic Cracking (FCC) unit margin.

REFINERY BLENDING SIMULATION — 0.25 day

Case study: managing the blending operation of a refinery taking into account the economic and technical (product specifications, capacities, etc.) constraints.

OPTIMIZATION OF REFINING OPERATIONS - LINEAR PROGRAMMING — 1 day

Linear programming (LP) principles: linear equation, objective function, profit maximization or cost minimization, Simplex method, graphic interpretation, etc.
Analysis of the LP results: optimum properties, marginal costs, domain of validity of the results, etc.
Case study on Excel: explanation of a refinery model matrix (material balances, product specifications, utilities consumption, objective function, etc.); team work on the optimization of a cracking refinery and on the result analysis.
Principles of refining management: constraints, operational organization.
Monthly program to daily operations.

INVESTMENT PROFITABILITY STUDIES — 1 day

Value creation and capital cost, cash flows, discounting principle and inflation impact.
Standard global profitability analysis: cash flow schedule, economic criteria (net present value, internal rate of return, etc.).
Introduction to risk analysis.
Exercises on various investment profitability studies for refineries and petrochemical plants.

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Training - Degradation and Corrosion Prevention

CICP-EN-P | Face-to-face only | 5 days

This course provides a practical knowledge of pressure equipment and piping corrosion, and explains prevention strategies

Level
Skilled

Public
Experienced inspection, maintenance, HSE, process engineers, managers and technical staff involved in safe operation and integrity of pressure equipment installed in refineries, chemical and petrochemical plants

Objectives
Attendees will be able to implement the following skills:

- Recognize the different forms of deterioration affecting industrial equipment
- Specify the elements to be taken into account to prevent corrosion
- Specify the elements to be taken into account to predict and control the evolution of an installed corrosion

Pedagogical & technical resources

- Active teaching methods are used to promote a pooling of experience, under the lead of inspection specialist
- Actual accidents in refineries and chemical plants are analyzed to be aware of the risks
- Wide use of samples, videos and pictures to develop practical case studies for pressure equipment such as piping, heat exchanger, reactor, distillation column, boiler, etc

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

METALLURGY USED FOR PRESSURE EQUIPMENT & PIPING MANUFACTURING — 1 day

Ferrous and non-ferrous material: microstructure, composition, mechanical properties.
Plates, forging, castings, piping, rolling, welding, post weld heat treatment.
Pressure equipment design and manufacturing.

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USUAL TYPES OF CORROSION & DETERIORATIONS — 1 day

Different types of industrial corrosion: uniform, pitting, crevice, intergranular, hydrogen embrittlement stress corrosion cracking, corrosion-erosion, galvanic, selective.
Definitions and basic mechanism: wet corrosion, dry corrosion.
Metallurgical deterioration: brittle fracture, chromium precipitation, creep, fatigue.

TYPES OF CORROSION IN OIL & GAS INDUSTRIES & PETROCHEMICAL PLANTS - API 571 — 1.5 days

Use API 571 to study each type of corrosion along with possible prevention for pressurized vessel and piping.
Application to old plants already in service, or during design of new plants.
Specific corrosion occurring in industrial installations:

- Hydrogen induced cracking, high temperature hydrogen attack, high temperature sulfur corrosion, oxidation, flue gas corrosion, naphthenic acid corrosion, polythionic acid corrosion, caustic soda stress cracking, Amines corrosion, CO2 corrosion.

Specific corrosion existing in chemical industry: corrosion by mineral acids, bases, nitrates, ammonia or chlorine.
Many corrosion case studies observed in process industry units: identification of corrosion root cause and mitigation to apply.

CORROSION PREVENTION & INSPECTION - API 510 — 1.5 days

Material selection and detailed engineering design to avoid corrosion based on API 510 principles.
Identification of operating windows.
Corrosion control by means of sampling, use of corrosion coupons and probes.
Cathodic protection with sacrificial anodes or imposed current.
Anticorrosion coatings and cladding.
Non-destructive testing.
Risk Based Inspection according to API 581.

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Training - Cogeneration - Combined Cycles

COGENE-EN-P | Face-to-face only | 3 days

This course deals with cogeneration units in existing plants or new projects

Level

Skilled

Public

Graduate engineers and technicians whose activities are related to the design and/or operation of these installations: engineers and technicians from engineering companies, technical and HSE support, operation team, personnel from insurance companies

Objectives

Attendees will be able to implement the following skills:

- Describe the conditions for combined thermal and mechanical power generation
- List the criteria for evaluating and monitoring the performance of the various elements constituting a cogeneration

Pedagogical & technical resources

Several practical applications related to actual industrial cases

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

DIFFERENT CYCLES AND MAIN CONSTITUENTS — 1 day

Operating principle and operating conditions of cogeneration and combined cycles - Typical schemes.
Main parts of the different cycles: Biomass and conventional cogeneration cycle:

- Boiler, steam turbine (back-pressure or condensation).
- Gas turbine, waste heat recovery boiler.
- Alternator: Available technologies, operating modes: hard-coupled grid connection or stand-alone operation..

Energy balance and energy performances of each elementary operation: compression, combustion and expansion.

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Efficiency enhancement, heat recovery from exhaust gases (air preheater, waste heat recovery boiler).
Different operating modes (simple waste heat recovery, post-combustion, separate boiler) and performances.
Application: comparison of performance, mechanical and thermal energy split.

GAS TURBINE — 0.5 day

Operation: operating principle, ISO power rating vs site power rating, low-NOx combustion, control principle.
Technologies: classification, types of construction, auxiliary equipment, safety devices.

STEAM PRODUCTION — 0.5 day

Boiler Feed Water (BFW) quality, description of the physical and chemical required treatments.
Description of conventional boilers and waste heat boilers (HRSG / OTSG): water circuit, steam circuit, fuel circuits.
Operating conditions - Fuel consumption per ton of steam, depending on boiler type and operating conditions.
Main process control loops: boiler feed water, pressure and steam temperature, combustion, flue gas circulation draft.
Combustion monitoring, analyzers, aim and meaning of each measured parameter. Safety equipment and sequences.

STEAM END-USES — 0.5 day

Steam as a heating medium and mechanical driving fluid.
Conditions for its distribution and efficient utilization.
Steam turbines: operating principle, expansion work and efficiency, and produced energy.
Static expansion: expanded steam characteristics, steam de-superheating.

INDUSTRIAL OPERATIONS AND MAINTENANCE — 0.5 day

Operation of a CCGT unit – Cycle and plant optimization
Key stages of start-up and shutdown.
Monitoring the unit’s performance.
Routine monitoring.

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Training - Compressors Maintenance

COMPMAI-EN-P | **Face-to-face only** | **5 days**

This course provides a better understanding of the technology, performance and maintenance of centrifugal and positive displacement compressors

Level
Skilled

Public
- Engineers and technicians involved in centrifugal and positive displacement compressor maintenance or engineering
- Employees in charge of maintenance running of the compression systems

Objectives
Attendees will be able to implement the following skills:
- Describe the behavior and the technology of compressors
- Provide the maintaining solutions applied in their compression units
- Establish a diagnosis of the incidents and participate in the troubleshooting meetings

Pedagogical & technical resources
- Functional approach for a better understanding
- Interactive course
- Numerous examples and cases studies from the Oil & Gas production industry and analysis of manufacturer file

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNOLOGY & OPERATION — 2 days

Centrifugal compressors:
- Different types of centrifugal compressors.
- Component parts and architecture of a centrifugal compressor.
- Technology of the essential components: stator, rotor, bearings, thrust bearing, seals.
- Vibrations, critical speed, dynamic balancing.
- Auxiliary equipment: lubrication system, buffer gas, balancing line...

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- Safety parameters: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure...

Reciprocating compressors:

- Different types of reciprocating compressors.
- Component parts and construction of a reciprocating compressor.
- Technology of the essential components: cylinder, piston, valves, sealing systems, crankshaft, connecting rod...
- Auxiliary equipment: lubrication of motion parts and cylinders, cooling interstage and cooling devices systems, connections to the flare.

Rotary positive displacement compressors:

- Different types: screw, liquid ring, lobes, sliding vanes,...
- Component parts and architecture of a rotary compressor.
- Auxiliary equipment: lubrication system.
- Typical using.

MAINTENANCE (PREVENTIVE, CONDITIONAL, CORRECTIVE) 2 days

Preventive maintenance: systematic actions, routine, alignment...
Conditional maintenance: vibrations measurement, oil of lubrication analysis, thermography...
Corrective maintenance: mounting, dismounting, metrology, repairing technics.

ANALYSIS OF A MANUFACTURER DATABOOK 0.5 day

Data sheet.
Technologic choices.
P&ID reading.

TROUBLESHOOTING 0.5 day

Failure and incidents: surge, slugging, over limits functioning...

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Training - Compressors Operation

COMPOP-EN-P | **Face-to-face only** | **5 days**

This course provides a better understanding of the technology, performance and operation of centrifugal and positive displacement compressors

Level
Skilled

Public
- Operation and technical department staff involved in the operation of centrifugal and positive displacement compressors
- Employees in charge of running and checking compression systems

Objectives
Attendees will be able to implement the following skills:
- Describe the technology of centrifugal and positive displacement compressors
- Select the adequate operating conditions
- Explain the main operating problems
- Be involved in a troubleshooting process

Pedagogical & technical resources
- Functional approach for a better understanding
- Numerous examples and cases studies from the Oil & Gas production industry and analysis of manufacturer file
- Applications with dynamic simulators

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GAS COMPRESSION BASICS — 0.5 day

Compressor types. Selection.
Gas compression: key points, pressure ratio. Gas composition, typical thermodynamical laws and models.
Isothermal, isentropic, actual compression.
Compression work and power.
Single and multistage compression.

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TECHNOLOGY & PERFORMANCE — 2 days

Centrifugal compressors:

- Centrifugal compressor typical parts and arrangements.
- Technology of the essential components: stator, rotor, bearings, thrust bearing, seals.
- Vibrations, critical speed, dynamic balancing.
- Auxiliary equipment: lubrication system, balancing line, mechanical seals auxilairies...
- Safety devices: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure...
- Compression mechanism through a compressor stage.
- Operation limits. Surge. Various antisurge systems.
- Characteristic curves of the circuit and the compressor. Influence of the operating conditions: intake pressure and temperature, nature of the gas, rotation speed, IGV position.

Reciprocating compressors:

- Reciprocating compressor parts and arrangements.
- Technology of the essential components: cylinder, piston, valves, packings, crankshaft, connecting rod...
- Auxiliary equipment: lubrication of moving parts and cylinders, interstage coolers and cooling devices systems, flare connections.
- Safety devices: vibrations, rod drop, temperatures...
- Piston side compression map vs operating conditions Theoretical and practical cycles.
- Flow control with typical devices: spillback line, unloading, clearance pocket actuation,(e-)Hydrocom™ system.

Rotary positive displacement compressors:

- Rotary positive displacement compressor technologies.
- Auxiliary equipment.
- Operation: start-up/shutdown, survey, flow control.

OPERATION — 2.5 days

Centrifugal compressors:

- P&ID and logic security matrix analysis.
- Flow rate regulation. Adaptation to service conditions.
- Start-up, shutdown and isolation: hazards related to these phases.
- Survey and monitoring the compressor and auxiliary equipment under normal operating conditions.
- Case studies: typical incidents.
- Applications with dynamic simulator: start-up, shutdown, operation vs suction conditions.

Reciprocating compressors:

- Conventional control: start-up, shutdown associated risks.
- Monitoring the compressor and auxiliary equipment under normal operating conditions.
- Case studies: incidents.
- Applications with dynamic simulator: start-up, shutdown, operation vs suction conditions.

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Training - Corrosion and Risk Based Inspection

CORBIE-EN-P | Face-to-face only | 5 days

This course provides a practical knowledge of pressure equipment and piping corrosion, and Inspection strategy based on risk analysis

Level
Skilled

Public
Experienced engineers, managers and technical staff involved in safe operation and integrity of pressure equipment installed in refineries, chemical and petrochemical plants

Objectives
Attendees will be able to implement the following skills:

- Identify operating windows beyond which corrosion phenomenon happen
- Describe the RBI methodology for a petrochemical or chemical plant
- Determine the probability and consequence of a failure
- Set up a suitable inspection plan

Pedagogical & technical resources

- Active teaching methods are used to promote a pooling of experience, under the lead of inspection specialist
- Actual accidents in refineries and chemical plants are analyzed to be aware of the risks
- Wide use of samples, videos and pictures to develop practical case studies for pressure equipment such as piping, heat exchanger, reactor, distillation column, boiler, etc

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CORROSION IN OIL & GAS INDUSTRIES & PETROCHEMICAL PLANTS - API 571 — 1.5 days

Each type of corrosion is studied along with possible prevention for piping, drums, columns, heat exchangers, boilers and furnaces already in service, or during a new plant design.
Specific corrosion occurring in industrial units based on API 571:

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- Metallurgical deterioration: brittle fracture, chromium precipitation, creep, fatigue.
- Hydrogen induced cracking, high temperature hydrogen attack, high temperature sulfur corrosion, oxidation, flue gas corrosion, naphthenic acid corrosion, polythionic acid corrosion, caustic soda stress cracking, amines corrosion, CO2 corrosion.

Corrosion of alloys in chemical industry: corrosion by mineral acids, bases, nitrates, ammonia or chlorine
Many corrosion case studies observed in process industry units: identification of corrosion root cause and mitigation to apply.

CORROSION PREVENTION & INSPECTION - API 510 — 1 day

Material selection and detailed engineering design to avoid corrosion.
Identification of operating windows.
Corrosion control by means of sampling, use of corrosion coupons and probes.
Cathodic protection with sacrificial anodes or imposed current.
Anticorrosion coatings and cladding.
Basic non-destructive testing: PT, MT, RT, UT and advanced non-destructive testing: phased array...

RISK BASED INSPECTION - API 581 — 1 day

Collect Design data and inspection data.
Select Corrosion loops for each PID.
Calculate probability of failure based on damage factor - Quantitative approach using API581 workflow.
Calculate consequence of failure - Quantitative and semi quantitative approach using API581 workflow.
Evaluate the overall risk on API matrix.
Define inspection strategy: mitigations actions or inspection scheduling extension.
Overview of available commercial software “RBEYE”.
Example of industrial RBI strategy implemented.
RBI semi quantitative approach based on simplified Excel spreadsheet.

APPLICATION OF THE RBI METHOD WITH MINI-PROJECTS CASE STUDIES — 1.5 days

Application of API 581 RBI method using mini projects - Case studies as teamwork:

- Select the appropriate corrosion loops and pressure vessels.
- Identify the degradation.
- Apply API 581 workflow to define the probability of failure, the consequence of failure.
- Analyze the risk and propose risk mitigations with more efficient Non Destructive Testing or adjust inspection frequency.

Apply RBI semi quantitative approach based on simplified excel spreadsheet and compare the 2 methods.
Each group presents its RBI analysis and conclusion.

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Training - Operation of a Chemical Production Unit

CRC-EN-P | **Face-to-face only** | **4 days**

This training provides greater autonomy in the operation and optimization of the unit

Level
Skilled

Public
Site operating personnel involved in the operation of the unit(s) to be studied in more detail: chemical, petrochemical or refining industry: field operators, console operators, chief operators, as well as technician

Objectives
Attendees will be able to implement the following skills:

- Explain the characteristics of the chemical transformation(s) and separations implemented and the associated operational requirements
- list the operating parameters, the role of the control loops and the process control elements implemented
- detect the cause of the main malfunctions and know the appropriate corrective measures

Pedagogical & technical resources

- The program and content are adjusted according to the types of processes implemented on the site, under cover of a confidentiality agreement if necessary
- Content and case studies are applied to site units
- Numerous references on sites with very varied characteristics

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MAIN SECTIONS OF THE UNIT — 0.25 day

General diagram of the unit and detail of the reaction zone.
Main operating conditions: temperatures, pressures, flow rates; control.

CHEMICAL TRANSFORMATIONS — 0.5 day

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Composition of the feedstock and the reaction effluent - Nature of the feed and characteristics of the products.
Nature and characteristics of the reactions carried out: thermal effect, complete or balanced, catalyzed or not.
Nature of the catalyst (if relevant): mode of action, impact of poisons, causes of aging, etc.
Operating parameters: temperature, pressure, proportion of reactants.
Potential influence of operating conditions on the conversion rate, reaction rate, yield of undesirable products, etc.

EQUIPMENT & MATERIALS USED — 0.5 day

Reactors: type (plug flow, mixed), internal (nature of the wall, arrangement of the catalyst, agitators), associated materials and thermal fluids,
Separation equipment: distillation, filtration, etc.
Specific instrumentation, control and automation implemented, safety equipment (valves, rupture discs, inhibitor injection system, etc.°;

ANALYSIS OF OPERATING CONDITIONS — 1 day

Material balance - Thermal balance.
Influence of operating conditions: temperature, pressure, flow rate, etc. in an operating situation.
Conversion rates, selectivity and yield observed.
Reaction cycle: duration, evolution of parameters during the period. Operating constraints (catalyst aging, nature of effluents, variation in feed quality, etc.).
Operating conditions and parameters for the fractionation and downstream purification process.

UNIT OPERATION AND INCIDENTS — 0.75 day

Operation tuning case studies
Nature and origin of potential malfunctions: contamination of the feed, runaway, etc.
Safety Instrumented Systems.
Safety procedures. Consequences.

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Training - Cybersecurity for Managers

CYBRMNG-EN-P | **Face-to-face only** | **1 day**

Cybersecurity is nowadays affecting every aspect of business. Most managers, however, are not IT experts and are often left at the mercy of the IT department. The course “Cybersecurity for Managers” aims to fill this gap by making you into a solid sparring partner for the IT department

Level

Awareness

Public

Management level

Objectives

Attendees will be able to implement the following skills:

- What are the essential questions I should ask my IT team ?

Pedagogical & technical resources

Virtual classroom ended by a business case

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MODULE 1

Introduction cybersecurity.
Why do hackers hack?
Overview of common cyber-attacks.

MODULE 2

Cyber security governance.
Management responsibilities.
How much security is enough?

MODULE 3

Taking action.

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Asking the right questions.
Personal cyber hygiene.

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Training - Cybersecurity for O&G Professionals

CYBROGP-EN-P | **Face-to-face only** | **1 day**

Cybersecurity is nowadays affecting every aspect of business. However, most O&G professionals do not have much IT experience. The course “Cybersecurity for O&G Professionals” aims at emphasizing the role of employees as first-line defenders of company information, and at recognizing most common attack tactics. The course will also give some keys to ensure protection of company computer at home and personal devices (e.g. mobile phones)

Level

Awareness

Public

Anyone who works with computers, regardless of previous IT experience

Objectives

Attendees will be able to implement the following skills:

- Participants will be (more) aware of the important role that professionals play as a first-line defense against cyber attacks, and will be able to effectively defend themselves against possible attacks.

Pedagogical & technical resources

Virtual classroom ended by a business case

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO CYBERSECURITY

Introduction to cybersecurity.
The role of employees as company data first-line defenders.
Who is the weakest link? Are you?

MOST COMMON CYBERATTACKS

Review of common attack tactics.
How to recognize them?
E.g. phishing, e-mail scams, WhatsApp abuses, modern attacks.

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PROTECTION

Risks of working from home.
Protecting personal devices such as mobile phones and tablets.
Protecting your privacy online.
Cyber hygiene.

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Training - Introduction to Data Science and Analytics for O&G Professionals

DABASIC-EN-D | **Distance only** | **1 day**

This course aims at introducing data science and analytics, which aims at extracting knowledge from raw data to build data-driven models. It will introduce the workflow involving data exploration, preprocessing and machine learning modeling

Level

Awareness

Public

O&G professionals getting involves in Data Analytics and Machine Learning projects

Objectives

Attendees will be able to implement the following skills:

- Understand the data science and analytics objectives (data science, analytics and machine learning)

Pedagogical & technical resources

- Participative lecturing
- Case studies
- Team work/mini-project

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO DATA SCIENCE & ANALYTICS

Concept of data science.
Data analytics.

DIFFERENT LEVELS FOR DATA ANALYTICS

Descriptive.
Diagnostic.

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Predictive.
Prescriptive.
Cognitive (AI).

DATA ANALYTICS PRINCIPLES

Data statistics (univariate, bivariate, distributions).
Data ranking (correlation matrix, principal component analysis, fuzzy logic).

DATA ANALYTICS WORKFLOW

Exploratory data analysis.
Data preprocessing.
Machine learning models.

SOME O&G APPLICATIONS

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This training course is offered under the **Alliance4Training** brand

Training - Crude Oil and Vacuum Distillation

DADSV-EN-P | **Face-to-face only** | **5 days**

This course provides a deeper understanding of the operating and monitoring of atmospheric and vacuum distillation units

Level
Skilled

Public
Engineers, senior operation personnel and technical supervisors interested or involved in the operation, optimization and monitoring of crude oil atmospheric distillation and residue vacuum distillation units

Objectives
Attendees will be able to implement the following skills:

- Give the meaning of the operating parameters of the atmospheric and vacuum distillation units
- Identify the controls and adjustment variables of the columns with multiple racks
- Specify the operational optimization points of these units
- Explain the logic of protecting this type of unit in the event of an incident

Pedagogical & technical resources

- Applications, teamwork, case studies and interactive workshops based on typical real situations
- Possible use of a generic dynamic simulator for crude oil distillation unit operation issues
- The duration and content of the training course can be customized to the needs of the client site and the profile of the participants
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

IMPACT OF CRUDE OIL QUALITY ON PRODUCTS — 0.5 day

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Tuning of the volatility of petroleum fractions in view of their end-use: constraints and flexibility of cut points; principal problems related to quality.
Crude oils: properties (TBP analysis), product yields, related margins.
Main schemes for crude oil fractionation.

OPERATING CONDITIONS OF AN ATMOSPHERIC & VACUUM DISTILLATION UNITS — 2 days

Material balance: cut points, product characteristics, separation quality, fractionation capability.
Top condensation and pressure in the column - Partial pressures.
Feed vaporization: inlet temperature, overflash.
Product side stripping.
Heat balance of the column - Pumparounds and heat integration.
Modern internals for crude oil distillation column.

DESALTING & CORROSION CONTROL — 0.5 day

Corrosion by sulfur, naphthenic acids and mineral salts.
Crude oil desalting: purpose, functioning of the desalter, operating variables and troubleshooting.
Downstream neutralizing treatment: purpose, advantages and drawbacks.
Controlling corrosion at the head of topping column and anticorrosion techniques.

SAFETY & ENVIRONMENTAL CONCERNS — 0.5 day

Process risks: H2S, inflammability, auto-inflammation.
Risks related to main equipment: furnace, pumps, vacuum system.
Heat recovery optimization and energy consumption.
Efficient and low energy consumption vacuum equipment (steam ejector vs. liquid ring pump).

PROCESS CONTROL, OPERATION & TROUBLESHOOTING OF MULTI-DRAW-OFF COLUMNS — 1 day

Different control systems in atmospheric and vacuum distillation columns, using flowrate, level or temperature control.
Cut point control: modification of flowrate of a cut and consequences on the column.
Impact of the preflash on the operation of the furnace and the atmospheric column.
Separation control: tuning of the separation selectivity, consequences on the column and on the heat recovery system.
Influence of pressure and pressure control.
Case studies on overall control setup of these two distillation columns and disturbances.
Maximizing the performances of the unit under constraints or limit conditions.
Start-up - Shutdown - Troubleshooting.

DISTURBANCES & TROUBLESHOOTING — 0.5 day

Case studies (in groups) related to disturbances and incidents; detection, consequences and corrective actions:

- Stripping shutdown.
- Failure of one pumparound pump, of the furnace.
- Loss of part of the feed, etc.

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Training - Data Science for E&P Operations

DAEP-EN-D | **Distance only** | **10 days**

The Data Science for E&P operations training will give an understanding of data analytics to all O&G professionals willing to understand how data science, and machine learning in particular, have become more and more common in the industry

Level

Awareness

Public

Professionals from all O&G disciplines who plan to have responsibilities in the data analytics domain

Objectives

Attendees will be able to implement the following skills:

- Learn the main concepts of data science
- Understand the machine learning/artificial intelligence concepts
- Be able to build a basic python program
- Learn about ML applications for O&G industry
- Be able to interact with data scientists/ITs involved in ML applications

Pedagogical & technical resources

Interactive lectures, case studies and exercises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO DATA SCIENCE & ANALYTICS FOR O&G PROFESSIONALS

MACHINE LEARNING CONCEPTS

PYTHON SCRIPTING

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TEXT ANALYSIS USING MACHINE LEARNING

OBJECT DETECTION

ML MODEL EVALUATION/VALIDATION

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Training - Python Scripting

DAPYTH-EN-D | **Distance only** | **1 day**

Python is a user-friendly programming language, which is commonly used in in artificial intelligence projects and machine learning projects. It includes many modules for creating graphical user interfaces, connecting to relational databases..., which makes it one of the main software currently used in data science projects today

Level

Awareness

Public

Graduate from all technical disciplines. Tailored to the non-programmer

Objectives

Attendees will be able to implement the following skills:

- Acquire the basics for scripting in Python language

Pedagogical & technical resources

- Participative lecturing
- Case studies
- Team work/mini-project

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

INTRODUCTION TO PYTHON

Discover Python basic syntax (Python string syntax; comments, numbers, and variables rules and functions (Python rules; string functions) objects, properties and methods; looping; write to a file - Have scripts create a text file (writing to a text file; file workflow).

CREATE PYTHON SCRIPTING FOR GIS

Create a script tool for geoprocessing; document the tool.

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MINI-PROJECT

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Training - National Data Repositories and Data Rooms

DATROOM-EN-D | **Distance only** | **2 days**

Promoting subsurface assets in a very competitive market is a very challenging task. A good data collection, correctly managed over time, is the best instrument for authorities and national agencies not only to illustrate the attractivity of their acreage but also to organize a transparent competition between potential licensees for the benefit of the nations

Level

Awareness

Public

Authorities technicians and engineers in charge of designing, implementing or reviewing a data governance in order to improve the attractiveness of subsurface data assets

Objectives

Attendees will be able to implement the following skills:

- Design and implement a data governance for NDRs and related activities
- Organize attractive, efficient and securized data rooms

Pedagogical & technical resources

Interactive lectures, case studies and exercises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION

Data is an asset. Importance of data in the exploration and production business.
Data governance - Who is the data owner?
Petroleum project life cycle and data life cycle.
Summary of main geoscience data formats.
Role of the data rooms.

COLLECTING EXPLORATION & PRODUCTION DATA

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Comparison of the data collection guidelines in various North Sea countries. Yellow book and blue book.
Automatizing data exchange, the PRODML standard.
OSDU – Open Subsurface Data Universe.

MANAGING PHYSICAL DATA: CORES, TAPES & PAPER ARCHIVES

Core storage and core digitalization.
Remastering seismic tapes.
Scanning paper archives. OCR.

FROM DOCUMENTS TO DATA

Structured and unstructured data.
Several style of data storage: relational, graph and NoSQL databases.
Metadata, pull and push data access.
Data mining, deterministic and stochastic methods.
Document and content management systems.

DATA QUALITY FOR DATA ROOMS

The lean data management approach.
The 6-sigma data management approach.
The data quality criteria.
A quantitative approach of the data quality management.

CYBER SECURITY - DATA SECURITY MANAGEMENT FOR DATA ROOMS

Our data are at risk!
Prevention strategy and tactics.
CRUDE matrix and confidentiality management.
Data retention management.

ORGANIZING EFFICIENT DATA ROOMS

The role of the data rooms.
Physical and virtual data room.
Data publication on the web, market place.

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Training - Data Base Set Up and Evaluation

DBASE-EN-P | **Face-to-face only** | **5 days**

O&G professionals are getting more and more involved in data management. Setting up a fit-for-purpose database is often a challenge. Based on DAMA book of knowledge, the Data Base Set Up & Evaluation training aims at focusing on understanding data management needs and organizing an adequate data base in a given O&G organization

Level

Awareness

Public

Data managers, information managers, technical managers, technologists, geoscientists, Reservoir Engineers, involved in organizing data bases or assessing them (e.g. data rooms)

Objectives

Attendees will be able to implement the following skills:

- Set up a data governance plan within their organization
- Identify and select the most appropriate data base architecture, depending on available data
- Define data security requirements
- Set up data quality criteria

Pedagogical & technical resources

Interactive lectures ended by a business case

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

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Responsable

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Program

O&G DATA GOVERNANCE — 0.5 day

Data management, as per DAMA.
Data governance.
Responsibility sharing for efficient Data Management; RACI matrix.

DATA ARCHITECTURE & DATA OPERATIONS — 0.5 day

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ER diagrams, SQL, NoSQL, graph databases.

PHP & SQL — 1 day

Hands-on exercise on PHP and SQL.

DATA INTEGRATION — 0.25 day

OLAP and OLTP.
Data warehousing, ERP and BI products.
Data virtualization.

DATA RETENTION & SECURITY — 0.75 day

Back-up; archives.
Legal constraints: SOX, GDPR.
Common attacks and mitigations.
ISO 27001.

DATA QUALITY — 0.5 day

End users expectations.
Quality criteria.
Quantitative approach.

DATA MANAGEMENT SKILLS — 0.5 day

Data Management jobs.
Skills assessment in PPDM and CDA.

MINI-PROJECT — 1 day

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Training - Introduction to refining

DECRAF-EN-P | **Face-to-face only** | **2 days**

This training course provides simple technical information on refining processes

Level

Awareness

Public

Non-technical professionals (engineers, technicians) in the Oil & Gas industry or related sectors interested in the oil refining business

Objectives

Attendees will be able to implement the following skills:

- describe the principle of a manufacturing diagram of petroleum product, including the purpose of the main refining units
- analyze the main constraints and trends of the refining industry

Pedagogical & technical resources

- Various pedagogical activities (quizzes, interactive games, summaries) ensure interactivity with participants and help them memorize a typical refining diagram
- The content of the material can be adapted to suit the customer's needs
- A virtual tour of a refinery in enhanced reality allows participants to appreciate the scale of the equipment and units presented
- A glossary of the main technical terms used in refining enables rapid familiarization with the vocabulary of the sector

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

CRUDE OILS & PETROLEUM PRODUCTS — 0.5 day

Main characteristics of commercial products, relation with their composition.
Environmental constraints and the emergence of biofuels in formulations.

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REFINING STEPS

1.5 days

Origins of crude oil, means of supply, overall properties.
Simple refining diagram: initial fractionation of crude oils, transformation processes according to refining criteria and blending of the bases obtained.
The role of the various refining units, their interdependence and the operating conditions of the main units: catalytic reforming, isomerization, hydrorefining, sulfur recovery, thermal and catalytic cracking.
Main product and process hazards.

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Training - Object Detection

DETECOB-EN-D | **Distance only** | **3 days**

Deep learning, a branch of artificial intelligence has recently provided some new approach to recognize objects (patterns) in images and videos. In the domain of Oil & Gas activities, this has a lot of applications like: seismic interpretation seismic attributes micro-paleontology petrography video surveillance The object detection has proven his efficiency in some domain to increase the O&G engineers capabilities, this training is about to explain by lecture and practical exercises the fundamentals of theses algorithms

Level

Awareness

Public

Geoscientists who have to work with data scientists to develop object detection tools, or for geoscientists who have to use object detection tools to reach their business objective. The notebook workshops are designed for people having or not a python experience, but some general knowledge of coding is required

Objectives

Attendees will be able to implement the following skills:

- Know about the various strategies offered by deep learning to detect objects
- Measure the accuracy of the models
- Understand the current limitation of object detection

Pedagogical & technical resources

This course can be delivered using in-person lectures or virtual classrooms. Each training module contains lectures, hands-on practices and/or case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

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Responsable

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Program

DAY 1

INTRODUCTION

Problem statement.

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Machine learning versus deep learning.

CLASSIFICATION USING A CNN ALGORITHM

Neural network and CNN.
Classifying hand written numbers using a CNN:

- MNIST dataset.
- Building a LeNet5 notebook.
- Analyzing the benchmark, how to measure the performance of a model.

What does happen is the image dataset is more complex: classifying CIFAR-10 dataset.

DAY 2

THE R-CNN FAMILY ALGORITHMS

R-CNN.
Fast R-CNN.
Faster R-CNN.

THE YOLO APPROACH

UNBOXING YOLO, TESTING IT ON A VIDEO

Training a YOLO architecture.
Performance.

DAY 3

IMPROVING IMAGES WITH GAN - GENERATIVE ADVERSARIAL NETWORKS

How GAN works, discriminative and generative models.
Generator and discriminator models.
Improving object detection with GAN.
Application in seismic modeling.

FROM UNSUPERVISED TO SUPERVISED MODELS FOR SEISMIC INTERPRETATION

The issue with supervised CNN.
3 unsupervised classification of seismic data:

- K-means clustering.
- Agglomerative hierarchical clustering.
- Kohonen self-organizing feature map (SOFM).

Supervised models for seismic interpretation, the state of the art.

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Training - From Data Lakes to Digital Twins

DIGTWIN-EN-D | **Distance only** | **2 days**

In a digital networked environment, new approaches are coming up to put in place an Information Management Framework towards the use of a Digital Twin to support various processes along the plant lifecycle Why an Information Management Framework? Which standards to build it? How to preserve the semantics of data and control their interpretation? How to improve the data consistency and quality? How to enable the reuse of information? Which use cases for a digital twin? A standards-based approach is a prerequisite to succeed in the digital transition in industry. Other aspects need also to addressed to mitigate the risks of this digital transition impacting an industrial ecosystem

Level

Awareness

Public

Professionals from all Oil&Gas and Renewable Energies' disciplines who plan to have responsibilities in the digital transition progam in their industrial context and in the data management domain

Objectives

Attendees will be able to implement the following skills:

- Understand how to build an Information Management Framework based on standards
- Understand the key concepts and what is at stake in the digital transition from methodological, technological, economical and social points of view

Pedagogical & technical resources

This course can be delivered using in-person lectures or virtual classrooms. Each training module contains lectures, hands-on practices and/or case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO INFORMATION MANAGEMENT FRAMEWORK

Introduction to ISO/IEC 81346, Reference Designation System: key concepts, the differents parts (1,2, 10 and 12), methods and tools.
Application to Power Systems, Civil Works and Oil and Gas Systems.

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The READI (Requirements And Digital Information) project: Lessons learnt and future work.

DATA INTEGRATION STANDARDS

ISO 15926, Integration of life-cycle data in process plants including Oil and Gas production facilities: the different parts of the standard and their evolution.
Introduction to W3C standards: RDF, OWL, SPARQL.
ISO 15926-14, Data model adapted for OWL 2 DL.
ISO 15926-4 and Posc Caesar Association Reference Data Library.

INTRODUCTION TO DIGITAL TWINS

Definition of a digital twin and its purposes.
Industrie 4.0 and Asset Administration Shell.
Benefits of a digital twin in the various phases of the plant-lifecyle.
Challenges and why a semantic information management framework is needed for a full benefit of a digital transition in industry?

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Training - Extractive Distillation

DISTEXT-EN-P | **Face-to-face only** | **3 days**

This course provides a deeper technical understanding of an extractive distillation column, its principle and consequences on the operation of the whole unit

Level
Skilled

Public
Anyone involved in the operation/troubleshooting of extractive distillation columns (process/operation engineers, shift leaders, panel operators, field operators)

Objectives
Attendees will be able to implement the following skills:

- Describe the role of the solvent and the functioning of the different extractive or non-extractive zones
- Explain the influence of each parameter on the conduct of the column and on the quality of the separation
- Identify the most frequent malfunctions and incidents

Pedagogical & technical resources

- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Implementation of static simulation results with C4/ACN and C6/NMP processes
- The case studies are dealt with in group and based on typical situations encountered in the operation of the related process units

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

SOLVENT EFFECT ON VAPOR-LIQUID EQUILIBRIA — 0.75 day

Typical composition of cuts to be processes: C4 and C6 cuts of a steamcracker or other units.
Natural volatility of compounds and focus on impurities to be removed, highlighting constraints and available processes.

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Action of the solvent and effects on relative volatilities of the compounds to be separated.
Effects of pressure, solvent ratio and feed composition.

BEHAVIOR OF AN EXTRACTIVE DISTILLATION COLUMN — 0.75 day

Feed composition. Required specifications.
Mass balance, product recovery ratio, losses of solvent.
Analysis of operating parameters: pressure and its pressure control system, solvent ratio, solvent temperature, thermal balance and vapor-liquid traffics.
Concentration profile: hydrocarbons and solvent, behaviors in extractive and non-extractive zones.
Meaning of temperatures and of temperature profile.

DOWNSTREAM PROCESSES — 0.5 day

Solvent recovery system and purification.
Make-up of solvent and adjustment of its composition in the solvent loop.
Superfractionation if needed.

OPERATING VARIABLES OF AN EXTRACTIVE DISTILLATION COLUMN — 0.5 day

Instrumentation and process control scheme.
Meaning of controlled parameters.
Impact of the modification of: solvent ratio, reboiler ratio, solvent composition and temperature and other parameters depending on the process configuration. Consequences on the yields, the composition of products and the energy consumption.

TROUBLESHOOTING & PROCESS INCIDENTS — 0.5 day

Solvent: decrease in flowrate, temperature modification, regeneration failure.
Feed: unexpected change in flowrate or composition.

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Training - Data Protection and Cybersecurity

DMCYBR-EN-D | **Distance only** | **5 days**

This course provides:

Level
Awareness

Public
IT staff and technical teams interested in cybersecurity. Engineers and technicians involved in data management and E&P data processing (G&G, national data base/reservoir engineering/production and field development). Data governance. Legal affairs. Human resources. Corporate risk management teams.

Objectives
Attendees will be able to implement the following skills:

- Define the elements of an Information Security Management System (ISMS)
- Describe network security fundamentals and evaluate the security configuration of networks
- Identify the steps of establishing a Security Operations Center (SOC);
- Describe the most common security attacks and their countermeasures
- Understand the security consequences of Cloud computing and define mitigating measures

Pedagogical & technical resources
Daily lecture, exercises, and case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO CYBER SECURITY

Importance of cybersecurity, cyber-attacks and lessons learned, cyber warfare, what are we trying to protect, are we successful?

SETTING UP AN INFORMATION SECURITY MANAGEMENT SYSTEM (ISMS)

Starting with ISMS: overview of key concepts based on ISO 27001, key artifacts.

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Introduction to risk management: purpose and specifics of risk management in an IT setting, qualitative vs. quantitative risk management.
Principles of information security policies and procedures: different kinds of documents: policies, procedures, guidelines and standards, roles and objectives of policies & procedures, typical content and format.
Workshop writing information security policies and procedures part I: group-based exercise in writing a brand-new information security policy on a chosen topic.

SECURING INDUSTRIAL SYSTEMS

Introduction into securing industrial systems:

- Overview of industrial systems such as SCADA and DCS and the impact on the ISMS.
- Practical concerns and considerations around industrial systems.

Overview of the IEC 62443 standard: overview of the IEC 62443 standard which applies specifically for securing industrial systems.

SPECIAL TOPICS INFORMATION SECURITY

Cloud computing:

- Developments in cloud computing, applicability within industrial systems.
- IaaS, PaaS, SaaS.

Setting up a Cyber Security Operations Center (SOC): benefits and challenges of a SOC, building and operating an industrial SOC.
Summary and the way forward:

- Recap of the course.
- Keeping the momentum going, suggested practical next steps.

SETTING UP DATA SECURITY

Data security: best practices of securing the organization’s data, data breaches and their impact.
Hands-on exercises based on real cases: Data breach incident management/data handling ethics.

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Training - Data Management and Data Science for E&P Operations

DMDAEP-EN-P | **Face-to-face only** | **50 days**

Whatever the Oil & Gas discipline, data is now taking a more and more important role in all business decision processes. An efficient management of data is becoming crucial for E&P companies, as data volume is constantly increasing and reservoir optimization is key. Because of this high data volume, data analytics have progressively invaded the O&G industry and been applied to a wide range of E&P applications The Data Management and Data Science for E&P Operations will provide a transverse understanding of how Data shall be managed and how it may be used to create value

IFP Training Certificate

Graduate Certificate

Level

Awareness

Public

Oil & Gas professionals who plan to take responsibilities in data management and be part of their company's digital transformation

Objectives

Attendees will be able to implement the following skills:

- Go through the main data types used in the E&P domain
- Learn the main concepts of data management, as described by DAMA
- Be able to select and develop appropriate methods to organize data
- Understand cybersecurity challenges
- Understand E&P georeferenced data
- Learn about the machine learning applications in the E&P domain
- Discuss machine learning models validity

Pedagogical & technical resources

Interactive lectures either as presential class or as virtual class, exercises or hands-on practice and a final 2-week project in IFP Training premises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the

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specific needs of learners from the professional world

Program

MODULE I: DATA MANAGEMENT FOR E&P OPERATIONS	**30 days**
MODULE II: DATA SCIENCE FOR E&P OPERATIONS	**10 days**
MODULE III: FINAL PROJECT	**10 days**

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Training - Data Management and Data Science Final Project

DMDAPRJ-EN-P | **Face-to-face only** | **10 days**

This module consists in 10-day workshops and hands-on project to apply data management and data science concepts to E&P real-case data. The objective is to mimic usual situations in E&P companies that could involve data management and data science, and to create/develop models in E&P domains (seismic, geology...) to enhance decision-making processes in a short time Working on several workshops, the trainees have to solve issues like how to organize the E&P data acquired in a data room? How to assess data quality? Can Artificial Intelligence help? How would supervised or unsupervised AI helps for seismic interpretation?

Level

Awareness

Public

- O&G professionals who want to have a practical experience of data management and data analytics.
- This module is part of the IFP Training's Data Management and Data Science for E&P operations graduate certification

Objectives

Attendees will be able to implement the following skills:

- Explore a set of PDF documents
- Receive and evaluate external data to be used in a project
- Train a model to extract information from PDF documents
- Benchmark the created models
- Export the information
- Load a 3D seismic data set
- Apply a semi supervised model to detect horizons and faults
- Export the results

Pedagogical & technical resources

Interactive workshops and final project with presentation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

WEEK 1

APPLIED DATA MANAGEMENT

Data reception.
Data Quality quantitative evaluation.

TEXT ANALYSIS: EXTRACTING INFORMATION FROM WELL REPORTS & LOGS

Selecting a training, a benchmarking and a blindtest data set.
Labelling the training set.
Building information detection models.
Benchmarking the models and defining a strategy to improve them.
Improving the models.
Blind testing.
Exporting the detected data.

WEEK 2

INTERPRETING A 3D SEISMIC CUBE USING A SEMI-SUPERVISED MODEL

Loading a SEGY file.
Automatic horizons interpretation.
Automatic faults interpretation.
Exporting faults and horizons.

FINAL PROJECT PRESENTATION

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Training - Data management for E&P operations

DMEP-EN-D | **Distance only** | **30 days**

Whatever the Oil & Gas discipline, data is taking a more and more important role in all business decision processes. Therefore, the role of the data manager, which was mainly seen as a data custodian, is now perceived as a major shareholder in all discipline The purpose of this module is to train Oil & Gas technicians and engineers to understand all the aspects and underlying of value creation based on data

Level

Awareness

Public

Professionals from all O&G disciplines who plan to have responsibilities in the data management domain

Objectives

Attendees will be able to implement the following skills:

- Learn the main concepts of data management
- Elaborate a detailed data governance plan
- Interact effectively with IT and software engineer to define the data management resources
- Specify a GIS project, and understand what is Earth Modeling from a data point of view
- Understand the concepts for an efficient dataroom

Pedagogical & technical resources

Interactive lectures, case studies and exercises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

E&P DATA: VALUE & FORMAT

DATA MANAGEMENT FUNDAMENTALS

DATA PROTECTION & CYBERSECURITY

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E&P DATA ARCHITECTURE & BIG DATA

VIRTUALIZATION & DATA TRANSFER/IOT

GEOGRAPHIC INFORMATION SYSTEMS

FROM DATA LAKES TO DIGITAL TWINS

DATA QUALITY MANAGEMENT

NATIONAL DATA REPOSITORIES & DATA ROOMS

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Training - Data Management Fundamentals (DAMA)

DMFUND-EN-D | **Distance only** | **5 days**

This 5-day course addresses all the information management disciplines as defined in the DAMA body of knowledge (DMBoK). Taught by an industry recognized DAMA DMBoK (2.0) author and CDMP(Fellow) this course provides a solid foundation across all of the disciplines across the complete Information management spectrum. By attending the course, delegates will get a firm grounding of the core Information Management concepts and illustrate their practical application with real examples of how Information architecture is applied

Level

Awareness

Public

Practitioners involved in Information management, data governance, master data management and data quality initiatives including: information managers, information architects, data architects, enterprise architects data managers, data governance managers, data quality managers, information quality practitioners, business analysts, executives, technology leaders, business technology partners

Objectives

Attendees will be able to implement the following skills:

- Appreciate concepts including lifecycle management, normalization, dimensional modeling and data virtualization and appreciate why they are important
- Understand the different facets (dimensions) of data quality and explore a workable data quality framework
- Describe the major considerations for successful data governance and how it can be introduced in bite-sized pieces
- Understand the different types of data models and their applicability

Pedagogical & technical resources

Daily lecture, exercises, and case studies. DAMA certification exam

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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INTRODUCTION TO DAMA

What is data management and why is it critical.
What are the different disciplines of data management?
DAMA & the DMBoK 2.0, and its relationship with other frameworks (TOGAF/COBIT...).
Overview of available professional certifications focusing on DAMA CDMP.

DATA GOVERNANCE

What is Data Governance and why it is important. A typical data governance reference model.
The main data governance roles: owner, steward, custodian.
The role of the Data Governance Office (DGO) and its relationship with the PMO.
What is the difference between Data Governance and IT Governance, and does it matter?
Overview of the Data Management implications of a selection of other regulations.
The key steps that organizations can take to prepare for compliance with current and future regulations.
How to get started with data governance and sustaining and building data governance.

DATA LIFECYCLE MANAGEMENT

Proactive planning for the management of data across its lifecycle.
Differences between data life cycle and a Systems Development Lifecycle (SDLC).
Data governance touch points throughout the data lifecycle.

METADATA MANAGEMENT

What is metadata and why it is important?
Types of metadata, their uses and their sources.
Metadata and business glossaries. What is the connection?
How metadata provides the essential glue for data governance and metadata standards.

DG MINI PROJECT

Starting the Data Governance Program, what you must get in place early. How to produce a realistic business case for DG linked to business objectives?

DOCUMENT RECORDS & CONTENT MANAGEMENT

Why document and records management is important.
Taxonomy vs. ontology... what's the difference.
Legal and regulatory considerations impacting records and content management.

DATA MODELING BASICS

Types of data models, their use and how they interrelate.
The development and exploitation of data models, ranging from enterprise, through conceptual to logical, physical and dimensional.
Maturity assessment to consider the way in which models are utilized in the enterprise and their integration in the System Development Life Cycle (SDLC).
Data modeling and big data.
Why data modeling plays a critical part in data governance and BP case study.

DATA QUALITY MANAGEMENT

The different facets of data quality, and why validity is often confused with quality.
The policies, procedures, metrics, technology and resources for ensuring data quality.
A data quality reference model and how to apply it.
Why data quality management and data governance are interconnected and case studies.

DATA OPERATIONS MANAGEMENT

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Core roles and considerations for data operations.
Good data operations practices.

DATA RISK & SECURITY

Identification of threats and the adoption of defenses to prevent unauthorized access, use or loss of data and particularly abuse of personal data.
Identification of risks (not just security) to data and its use.
Data management considerations for different regulations, e.g. GDPR, BCBS239.
The role of data governance in data security management.

MASTER & REFERENCE DATA MANAGEMENT

The differences between reference and master data.
Identification and management of master data across the enterprise.
4 generic MDM architectures and their suitability in different cases.
How to incrementally implement MDM to align with business priorities.
Statoil (Equinor) case study.

DATA WAREHOUSING, BUSINESS INTELLIGENCE & DATA ANALYTICS

What is data warehousing and business intelligence and why do we need it.
The major data warehouse architectures (Inmon & Kimball).
Introduction to dimensional data modeling.
Why master data management fails without adequate data governance.
Data analytics and machine learning and data visualization.

DATA INTEGRATION & INTEROPERABILITY

What are the business (and technology) issues that data integration is seeking to address?
Data integration and data interoperability - What's the difference?
Different styles of data integration and interoperability, their applicability and implications.
The approaches and guidelines for provision of data integration and access.

DAMA CERTIFICATION-FIRST LEVEL

Students will have the opportunity to sit the CDMP Data Quality specialist exam at the end of this course to attain DAMA Certified Data Quality Professional designation and a credit towards attainment of a full CDMP at Practitioner or Master Level.

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Training - Data Management Challenges for Managers

DMMNG-EN-P | **Face-to-face only** | **2 days**

In the whole O&G industry, data is taking a more and more important role in all business decision processes Most managers, however, are not data management experts. The purpose of this course is to highlight how critical and valuable data is, and also to emphasize on the benefits of robust data management on business

Level

Awareness

Public

Management level

Objectives

Attendees will be able to implement the following skills:

- Why is data management critical for successful business
- What are the benefits of robust data management

Pedagogical & technical resources

Interactive lecture and business case

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO DATA MANAGEMENT

What is data management and why is it critical.
What are the core disciplines of data management.
Why should the business be concerned with data management.
What are the benefits of robust data management.
What are the business issues when data management is not in place.

DATA QUALITY & MASTER DATA MANAGEMENT

What are the different facets of data quality.
Why validity is often confused with quality.

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What are the real implications of “single view” of a data object (e.g. well, customer) and what needs to be established to make this a reality.
What are the technical solution options... and their implications.
Statoil (Equinor) case study.

BUSINESS DATA GLOSSARY

What are data models and why they are still critical.
The big mistakes made with big data and why data modeling is required.
Why data modeling plays a critical part in data governance and bp case study.
Metadata and business glossaries. What’s the connection and why it’s an essential component in a business.

CYBER DATA RISK & SECURITY

Identification of different types of threats.
Approaches and the adoption of defenses to prevent unauthorized access, use or loss of data and particularly abuse of personal data.
Identification of risks (not just security) to data and its use.
Data management considerations for different regulations, e.g. GDPR, BCBS239.
The role of data governance in data security management.

DATA CENTRICITY & GOVERNANCE

What do we mean by data centricity?
What must be put in place to become data centric?
Components of a great data strategy.
Establishing goals and gaining buy-in for a data strategy.
How to get started with data governance in bite sized chunks.

Sessions

Rueil-Malmaison - From 09/28/2026 to 09/29/2026 **1920 €/HT**

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Training - Introduction to Data Management for Operations

DMOPE-EN-P | **Face-to-face only** | **3 days**

From the top floor to the drill floor it is frequently said that “data is an asset”. The purpose of this 3 days course is to illustrate: why data is an asset what are the main data types used in the E&P industry the data life circle various data storing strategies and implementations the data quality insurance and governance

Level

Awareness

Public

Technicians and decision makers of the drilling, construction, production and maintenance domain but out of the data-management discipline

Objectives

Attendees will be able to implement the following skills:

- Understand the data architecture of their organization
- Evaluate the quality of the data they consume
- Participate to the data quality improvement

Pedagogical & technical resources

Daily lecture and exercises and filed case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION — 0.25 day

The value of a data asset.
The main data categories for the drilling (FP), construction, reservoir, production, maintenance and HAS discipline.
The data management function as seen by DAMA.

DATA GOVERNANCE — 0.25 day

What is data governance, why it matters.

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The asset life cycle/the data life cycle.
The data shareholder, role and responsibility (RACI).
The role of the data stewards, data manager, data scientist...

DATA ARCHITECTURE MANAGEMENT USING THE DATA RELATED TO THE WELL DESCRIPTION — 0.25 day

What is a well (using the PPDM guideline), the importance of using a common vocabulary/semantic.
The CFIHOS IOGP data standard.
The energistic standards (PRODML, WITSML, RESQML).
The OSDU initiative.

DATA DEVELOPMENT — 0.25 day

Develop and maintain logical and physical data models for the production data.

DATA OPERATION MANAGEMENT — 0.25 day

The notion of SLA.
Cloud storage.
The notion of big data and data lake backups and archives.
Data visualization (incl. BI).
Data in a GIS.

DATA SECURITY MANAGEMENT — 0.25 day

Manage users (role, privileges...), monitor users authentication.
The information confidentiality classification.
Data security audit, introduction to ISO 27001.

REFERENCE & MASTER DATA MANAGEMENT — 0.25 day

Definition of both terms:

- Reference data: used taxonomy, semantic definition of the drilling data (e.g.: API).
- Master data: drilling data values.

Well data integration: the well UWI.

DATA WAREHOUSING — 0.25 day

Descriptive (content description) and transactional data.
Use case based on the management of spare part using SAP-PM and SAP-MM

DOCUMENT & CONTENT MANAGEMENT — 0.25 day

Unstructured data: e.g. the installation PIDs.
Implementing a Document Management Systems (EDMS).
Retention and disposition of document.

DATA QUALITY MANAGEMENT — 0.25 day

The different aspects of “Data Quality”.
Make the data “trustable”.
Lean and 6-sigma methodologies.
Define data quality metrics, measure and control the data quality.
Data audit.

PROFESSIONAL DEVELOPMENT OF DATA MANAGERS — 0.25 day

Data management as a recognized discipline.
How the oil companies digitalization journey impacts the data manager role.
Data managers in others industries.

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TAKEAWAYS

0.25 day

10 key points about data management to remember.

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Training - Practical Data Quality Management - DAMA

DMQUAL-EN-D | **Distance only** | **5 days**

Information is at the heart of all organizations, akin to blood flowing through its arteries and veins. However, all too often Information is not professionally managed with the rigor and discipline that it demands. Nonetheless the implications of poorly managed information can be catastrophic, from ICO and other regulatory sanctions ultimately to business collapse. Professor Joe Peppard summed it up when he said, “The very existence of an organization can be threatened by poor data” This course will provide the rationale why information management is critical and provide methods and practices for addressing key information management challenges

Certification

DAMA

Level

Awareness

Public

Personnel involved in Information management, data governance, master data management and/or data quality, initiatives including: information managers, information quality practitioners, executives, technology leaders, business technology partners, business analysts, enterprise architects, information architects, and data architects

Objectives

Attendees will be able to implement the following skills:

- The difference between "data quality" and "data quality management" and why it matters
- The relationship between data quality management and other core information management disciplines particularly master data management, data modeling and data governance
- Who is involved in making data quality initiatives work
- The major concepts that are fundamental to data quality management, such as a framework for Information quality, information life cycle, data quality dimensions, business impact techniques, root cause analysis techniques, etc..

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

MAKING THE CASE FOR DATA QUALITY

How can we make the connection between data quality and business needs?
What does “data quality” mean in the context of business processes and can we define it?
What is data quality vs data quality management and why does it matter?
What happens when it goes wrong? We will examine many examples of data quality issues from real world cases and assess their implications and see how these could have been avoided.

MEASURING DATA QUALITY

What are the different facets (dimensions) of data quality?
What do each of these dimensions’ mean?
What are the pitfalls of looking at just one data quality dimension in isolation?
How can we evaluate data quality for the data quality dimensions and are these applicable to the problems being faced? This is an essential step to provide the input for root cause analysis and remediation approaches.
4 different styles and approaches to reporting data quality will be discussed highlighting the benefit and applicability of each.

ASSESSING THE CAUSES & IMPACT OF POOR DATA QUALITY

Continuing the data quality measurement framework, what is the relationship between data quality dimensions, data quality measures and data quality metrics.
What is their applicability and how many should we include in our data quality assessments?
What are the techniques to determine the impact of poor-quality data on the business?
What are the benefits of increasing data quality and the business impacts of poor data quality?
Root cause analysis: What really caused the problem? An approach for identifying and prioritizing the real causes of the data quality problems?
Techniques for root cause analysis including “5-whys” & “Fishbone”.
Developing targeted strategies and approaches for addressing the causes.

A FRAMEWORK FOR IMPROVING DATA QUALITY

A data quality reference model & how to apply it.
Starting and sustaining a data quality initiative: the key steps for achieving data quality success, and the activities and structures that are required together with the necessary steps for creating the foundation for data quality.
What are the typical organization roles, responsibilities, organization structures and principles that should be in place to ensure successful data quality?
How can we put all of this together into a workable framework for establishing and sustaining data quality in your organization?
Now that you’ve made a start, how do you sustain data quality. How can we bake data quality (and other data considerations) into our “business as usual” activities to make it stick?

AUTOMATED SUPPORT FOR IMPROVING DATA QUALITY

What tooling & automated support exists for data quality initiatives?
What are the types and the applicability of software tools to support a data quality initiative?
What is a reference architecture model for data quality tools, and the common functions, capabilities, and the differences between them?
What items should we examine when selecting data quality tooling? An evaluation checklist will be discussed covering what to look out for.

FITTING DATA QUALITY INTO AN OVERALL INFORMATION MANAGEMENT FRAMEWORK

What is the relationship between data quality, master data management, data governance & the other information disciplines?

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What is the crucially important role of data models in a data quality initiative?
How is this governed? The essential part that data governance undertakes.
How do we measure the success of a data quality initiative & the pitfalls of tactical data cleaning where the data is corrected in situ?

MINI-PROJECT

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Operation of a Multiple-Draw Distillation Column

DSMSS-EN-P | **Face-to-face only** | **5 days**

This course provides a deeper understanding of the working principle and operational tuning of multiple-draw-off distillation columns through a hands-on experience

Level

Skilled

Public

Console operators, production supervisors, shift supervisors in charge of multiple-draw-off columns: crude oil atmospheric and vacuum distillation unit, fractionation towers of cracking units

Objectives

Attendees will be able to implement the following skills:

- Specify the operating principles of multi-rack distillation columns
- Explain the role and importance of each of the control loops involved in the process control system
- Explain the adjustment of product qualities with regard to the use of setting parameters

Pedagogical & technical resources

- Use of a virtual column modeled on CORYS IndissPlus dynamic simulator
- Exercises are conducted in small groups of 2 to 3 participants, each group operating its own virtual column. Each exercise includes: a pre-discussion of the problem; definition of the target exercise objective; adequate time to run the virtual columns; open analysis of the results, shared with all participants; and practical conclusions related to the operation of the columns
- Attendees are invited to bring descriptions of their specific column control strategies for group discussion and analysis. Conclusions drawn from the exercises on the simulator can be transposed to other actual control schemes
- The content of the exercises can be customized to the needs and specific features of the client site
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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OPERATING PARAMETERS OF THE SIMULATED CRUDE DISTILLATION COLUMN — 1 day

Analysis of the column: instrumentation, control loops, and analyzers. Analysis of various operating conditions and the significance of each operating parameter:

- Material balance, concepts of cut points, quality and fractionation capability.
- Total and partial pressures, pressure profiles along the column.
- Feed temperature, over flash and energy consumption.
- Role and operating parameters of the strippers, and stripping ratios.
- Energy balance, heat extraction by pumparounds, and partial condensation, overflash.
- Overhead condensation: and various control systems.
- Liquid and vapor traffics, fractionation zone and heat transfer zones.
- Temperature profiles.

MODIFYING CUT POINTS — 2 days

Control of the mass balance, and characteristics of the products.
Change in the side streams flow rates - Change in the overhead cut flow rate.
Practice changing the cut point between two side streams to meet quality specifications.
Tuning the operating parameters of the strippers; vapor, reboiling, stripping ratio, and flash point.

ADJUSTING ENERGY BALANCE — 1 day

Modifying heat rates extracted by pumparounds: effects of changes to flow rates, internal traffics and properties of side streams.
Change in the transfer line temperature, and energy consumption. Influence of pressure and the consequence on feed heater and top degassing.
Consequence of changes to the energy balance, liquid and vapor traffics, and their effect on fractionation capability.

TUNING THE COLUMN — 1 day

Adjusting the quality of the products.
Optimization criteria for the energy balance: adjustment of the pumparounds to get the desired fractionation capability.
Influence of the main disturbances: feed flow rate, stripping steam - Influence of a change in the crude oil quality.
Specific features of other multiple-draw columns like vacuum columns and other fractionators.
Management of the different requirements (cut points, specification of cuts...) depending on the control scheme implemented for any column studied.

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Training - Distillation - Optimization and Troubleshooting

DSS-EN-P | Face-to-face only | 5 days

This course provides a comprehensive understanding of efficient distillation columns operation as well as optimization strategies implementation

IFP Training Certificate

Advanced Certificate

Level

Expert

Public

Engineers, process engineers, process control personnel and technical staff in the refining and petrochemicals industries

Objectives

Attendees will be able to implement the following skills:

- Know about all parameters and profiles for the analysis of a distillation column operation
- Master the concepts necessary to optimize the operation of a column
- Identify the performances and limits of different control systems
- Detect deficiencies, find their origin and solutions

Pedagogical & technical resources

- Highly efficient learning process: operation of a virtual column using a dynamic simulator that models the main physical phenomena of distillation
- Troubleshooting case studies to illustrate process control schemes
- The content of the exercises can be customized to the needs and specific features of the client site
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including an handling situation of operation to find the settings for tuning a column

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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OPERATING PARAMETERS: DEFINITION & SIGNIFICANCE — 0.5 day

Material balance of the virtual column: cut point, separation quality and concept of fractionation capability.
Column pressure: pressure control and pressure profile along the column.
Heat balance. Reflux and reboiling ratio and selectivity assessment.
Internal flow rates profiles, concentration and temperature profiles. Concentration peaks.

FRACTIONATION CAPABILITY OF AN INDUSTRIAL DISTILLATION COLUMN — 0.5 day

Impact of the parameters related to the fractionation capability:

- Liquid-vapor internal flow rates, associated with reflux and reboiling ratios.
- Number of theoretical stages and internal equipment efficiency.
- Position of feedstock inlet related to feed characteristics.

Fractionation capability and related energy consumption.
Each item is illustrated by practical exercises conducted by trainees on a dynamic simulator.

PROCESS CONTROL PARAMETERS — 3 days

The simulator handling scenario covers the different aspects of operation and control of columns. It starts with a simple control system and implements increasingly sophisticated control systems on increasingly complex columns: from binary to a multiple draw-off column (crude oil distillation).
Survey of operating disturbances; origins and causes.
Process control strategy and optimization targets.
External or internal reflux control, reboiling control with flow rates or duty monitoring.
Material balance control: sensitive tray, temperature control systems.
Optimization of the heat balance: additional energy through the feed or the reboiler, low pressure operation and energy savings.
Implementation of more complex control systems.
Analysis of disturbances caused by the feed and systems for feed forward control.
Implementation of process control in multi-column trains.
Specific case of multiple draw-off columns:

- Quality tuning through material balance (temperature, flow rate or level control).
- Heat balance monitoring (role of pumparounds and vaporizing refluxes, optimization of the fractionation capability).
- The participants can provide diagrams of their distillation columns, the methodology will be applied to confirm that a change of operating parameter does not have the same consequence according to the control scheme implemented.

EQUIPMENT TECHNOLOGY & TROUBLESHOOTING — 1 day

Trays: technology; high efficiency trays, performance and flexibility.
Packings and distribution systems: flooding, fouling, mechanical damage and remedies.
Reboilers and condensers: implementation and working principles, various control strategies, problems and related origins, possible solutions.
The items in this chapter are exemplified by case studies corresponding to actual industrial problems and related solutions.

Sessions

Rueil-Malmaison - From 06/15/2026 to 06/19/2026 — **4360 €/HT**

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Training - Downstream Economics and Management

EAV-EN-P | Face-to-face only | 15 days

This course provides participants a complete view of the economic principles of the downstream sector as well as the methods necessary for the decision-making processes

Level

Knowledge

Public

Professionals from the refining, the petrochemicals and the distribution sectors in a management position where they need to deepen their understanding of all the essential economic aspects as well as the management tools used in the oil downstream sector

Objectives

Attendees will be able to implement the following skills:

- Analyze the economic fundamentals of the energy scene, with an awareness of the importance of market dynamics and its impact on the downstream oil economy
- Explain the resource/output balances of the refining industry
- Design and use the management and optimization tools of a refinery to increase its productivity
- Understand the elaboration of oil contracts and their clauses
- Understand the meaning of the terms used in the contracts and their operational, legal and financial scope
- Estimate the economic values of the various intermediate or semi-finished products
- Evaluate the economic profitability of a project
- Set up a logistic scheme and master different supply modes
- Analyze the technical and economic aspects of a logistics chain
- Identify and analyze the possible synergies between refining and petrochemicals
- Explain the economic stakes and the main parameters influencing the profitability of these sectors

Pedagogical & technical resources

- Numerous case studies and group exercises
- Use of spreadsheets and the Excel solver (especially for economic optimizations and cash flow schedules)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the

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specific needs of learners from the professional world

Program

TECHNICAL-ECONOMIC FRAMEWORK OF THE OIL FLOW — 2 days

Fundamentals of supply and demand of crude oil and products
Refining supply: overcapacity, types and quantities produced.
Main issues: deep conversion, new product specifications, integration of petrochemicals, environment, etc.
Technical reminder of the main refining units: distillation, conversion, blending, etc.
Evolution of refining schemes.
Planning of supply, crude arbitrage, product quality, etc.
From monthly schedule to (daily) scheduling.
Refining costs and margins.
Optimization of margins from different units.
Case study: Valuation of intermediate products from a FCC (Fluid Catalytic Cracking) unit.

MARKETS & CONTRACTUAL FRAMEWORK FOR PETROLEUM PRODUCTS — 3 days

Price determination: market equilibrium (supply/demand) and its implications, trade-offs
Main parameters influencing the price of a crude oil or the price of a petroleum product
Presentation of the physical and financial markets
Methodology and role of reporting agencies: Platt's, Argus...
Notion of product, benchmark crude
Maritime transport component and estimation of the cost of maritime transport (use of "worldscale")
Review of the main types of chartering (voyage, time charter, bareboat...)
Roles and responsibilities of independent inspection companies
On board binder
Organization of a trading room.
Roles and responsibilities of each "office" (front-office, middle-office, back-office)
Functional review (legal, audit...) of contracts, review of Incoterms
Negotiation and drafting of a contract
Main clauses and their implications: Operational (laycan, laytime, NOR, demurrage), Financial (payment terms, credit limit, L/C (letter of credit), silent cover...), Customs, fiscal, legal (safeguard clause, force majeure clause...)
GT&C's (General Terms & Conditions) and risk assessment of each clause
Follow-up of the contract
Case studies: Purchase/sale of crude oil and products; hedging strategies

LINEAR PROGRAMMING — 2 days

Linear equations, preparation of a matrix.
Objective function, profit maximization or cost minimization.
Optimization of refining operations: Simplex method, graphical interpretation.
Analysis of linear programming results: properties of the optimum, validity domain of the results, marginal costs.
Sensitivity analysis.
Case study: construction of a refinery model matrix (material balances, product specifications, energy balance, objective function, etc.); group work on the optimization of a refinery operation.

INVESTMENT PROFITABILITY STUDIES — 3 days

Value creation and cost of capital, cash flow, discounting principle and impact of inflation.
Difference between income statement and cash flow. Key performance ratios at the corporate level.
Development of cash flow schedules: differences between income statement and cash flow, taking into account taxation, impact of working capital requirements, valuation horizon.
Economic evaluation criteria: Net Present Value (NPV), Internal Rate of Return (IRR), payback time, financial exposure, profitability index. Impact on project profitability.

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Introduction to risk analysis: Identification and consideration of risks (PESTLE analysis, risk premium), sensitivities ("Tornado", "Spider" graphs), scenarios.
Project financing and return on equity.
Exercises:

- Calculating the WACC of a company.
- Calculating the Impact of working capital on a polypropylene plant project.
- Profitability analysis of a Petrochemicals plant.
- Profitability analysis of a Bio refinery (ungeared and geared).

SUPPLY CHAIN MANAGEMENT — 3 days

Supply chain fundamentals
Mechanisms of inventory management: specifics, types of flows, inventory diagrams, lead times, product seasonality, impact of specification changes
Technical aspects of storage and transportation: underground and overhead storage, inventory measurement, losses, facility security, pipelines, safety stocks
Economic aspects of the logistics chain: costs, role of warehouses, sizing, investments, maintenance, contracted transportation
General and contractual characteristics of maritime transport
Benchmarking: performance indicators, operational optimization, economic optimization.
Case study: Analysis of a company's supply chain.

REFINING & PETROCHEMICALS SYNERGIES — 2 days

Main petroleum products and petrochemicals: reminder of key specifications.
Refining schemes vs. petrochemical schemes.
HSE specificities of refining (H2S, etc.) and petrochemicals (product instability, etc.)
Synergies of utilities exchanges (H2, gas, fuel oil)
Synergies of supplies: ethane, LPG, naphtha, atmospheric gas oil, vacuum distillate
Product exchanges (pyrolysis, olefins)
Joint processing of aromatic cuts and pooling of services
Refining vs. petrochemical margins and costs: gains from synergies
Case study: economics of a refinery, a steam cracker and the integration of the two using some synergy points.

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Training - Equipment Basic Maintenance

EBM-EN-P | Face-to-face only | 5 days

To provide in-depth knowledge related to the equipment technology and maintenance

Level

Knowledge

Public

Engineers from various disciplines: process, maintenance, operation, mechanical, inspection, HSE and supervisors

Objectives

Attendees will be able to implement the following skills:

- Recognize basics of the technologies of rotating machinery and static equipment installed on plants
- Describe the operating principle of this equipment
- List the basic maintenance practices, and reliability criteria

Pedagogical & technical resources

- Sharing of participants' best practices
- Numerous exercises
- Applications and case studies
- Visit of running plant or workshop if available

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BASICS IN STATIC EQUIPMENT — 1.5 days

Different types of piping valves and flanges types, valve types, safety valves and rupture discs, standards main failure modes and repairs
Distillation columns: operating principle; technology, fundamentals.
Different types of heat exchangers and vessels: technology, selection criteria.
Furnaces and boilers: operating principle; technology, control and safety features.

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Tanks: different types of storage tanks: fixed and floating roof, etc.
Case studies, exercises and applications.

ROTATING EQUIPMENT — 2.5 days

Centrifugal and positive displacement pumps: types, technology and selection criteria.
Centrifugal and positive displacement compressors: types, technology and selection criteria; operation.
Steam turbines and gas turbines: types, technology; operation and maintenance.
Basic machinery reliability, maintenance and troubleshooting.
Auxiliaries, lubrication and maintenance of rotating equipment.
Risks and failures dealing with these types of rotating equipment.
Preventive and corrective maintenance.
Vendor recommendations vs. operating constraints.
Case studies, exercises and applications.

MAINTENANCE GENERAL PRACTICES — 1 day

Types of maintenance: preventive, corrective, condition-based.
Fundamentals of reliability analysis and improvement methods: FMECA: failure modes, effects and their criticality analysis, failure trees, Reliability Centered Maintenance (RCM).
How to use Key Performance Indicators to measure, evaluate and enhance equipment performances.

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Training - Centrifugal Compressors Operation

ECC-EN-P | Face-to-face only | 5 days

This course emphasizes the technology, the performance and operation of centrifugal compressors

Level
Skilled

Public
Engineers and technicians involved in operation, monitoring and maintenance of centrifugal compressors

Objectives
Attendees will be able to implement the following skills:

- Explain the construction technology of a centrifugal compressor
- Explain the influence of operating parameters on the performance of a compressor
- Describe the most common flow control modes and anti-pumping controls
- Describe typical incidents and critical points to monitor

Pedagogical & technical resources

- Case studies based on industrial feedback
- Interactive course
- Various technical drawings of actual compressors
- Use of a dynamic simulator

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNOLOGY — 1.25 days

Different types of centrifugal compressors. Architecture of a centrifugal compressor.
Technology of the main components: stator, rotor, bearings, thrust bearing, seals.
Vibrations, critical speed, dynamic balancing. Auxiliary equipment: lubrication system, buffer gas, balancing line, etc.
Auxiliary equipment: lubrication system, buffer gas, balancing line, etc.
Safety devices: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure, etc.

PERFORMANCES — 1.75 days

Changes in gas velocity and pressure in a centrifugal compressor.

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Mass and volume flow rate vs operating conditions.
Discharge temperature, shaft power vs operating conditions.
Compressor performance vs operating conditions, impeller rotation speed and geometry.
Compressor performance curves and circuit system curves.

OPERATION — 0.5 day

Flow rate control.
Operating limits. Surge and stonewall. Antisurge devices.
Start-up and shutdown: key points.
Compressor monitoring in operation.
Troubleshooting.

DYNAMIC SIMULATION - APPLICATIONS — 1.5 days

Use of a dynamic simulator (Centrifugal compressor + steam turbine).
Exercises on start-up and shutdown phases.
Applications using disturbances generated by the lecturer.

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Training - Reciprocating Compressors Operation

EECV-EN-P | **Face-to-face only** | **5 days**

This training improves participants' skills on technology, operation and maintenance of reciprocating compressors

Level
Skilled

Public
Engineers and technicians involved in the operation, inspection and maintenance of reciprocating compressors

Objectives
Attendees will be able to implement the following skills:

- List the different parts of a compressor and explain their characteristics
- Explain the evolution of compressor operating parameters
- Implement appropriate monitoring for each type of compressor
- Be involved in troubleshooting activities

Pedagogical & technical resources

- Actual examples from the Oil & Gas and petrochemical industries
- Trainee participation is continuously encouraged through case studies selected by the lecturer or proposed by the trainees
- Use of a dynamic simulator (start-up/shutdown, general operation, disturbances/troubleshooting)

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNOLOGY — 1.5 days

Construction and design philosophies.
Components of reciprocating compressors: frame, cylinders, piston and rings, piston rod and crank head, crankshaft and connecting rods, bearings, compartment distance pieces, valves.
Auxiliary systems: pulsation dampeners, lubrication circuits, cooling systems, drains and vents,...
Safety devices.

PERFORMANCES — 1 day

Gas compression: models, discharge temperature, compression work and power.
Compressor efficiency vs valves, piston rings, cylinder cooling system and rod packings behavior.

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Indicator diagram. Compression/expansion cycle.
Case studies: discharge temperature and power calculation, indicator card plotting, efficiency calculation.

COMPRESSOR OPERATION — 0.5 day

Flow control.
Start-up, shutdown.
Performances vs compression ratio, gas composition, pressure and suction temperature.
Multistage compressors.
Case study.

TROUBLESHOOTING — 1 day

Machine monitoring: noise, vibration and temperature.
Typical defects and failures on: valves, piston rings and packings, piston rod,...
Safety devices.
Case studies: typical failures on reciprocating compressors.

DYNAMIC SIMULATION - APPLICATIONS — 1 day

Use of a dynamic simulator.
Exercises on start-up and shutdown phases.
Applications using disturbances generated by the lecturer.

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Training - Liquefied Natural Gas Economics

EGL-EN-P | Face-to-face only | 3 days

This training provides an overview of the economic and contractual aspects of the LNG (Liquefied Natural Gas) value chain

Level
Knowledge

Public
Professionals from the oil, gas or power industries or from the banking, insurance, and consulting sectors who need to understand LNG activities and their economic stakes

Objectives
Attendees will be able to implement the following skills:

- Identify the main LNG markets and their evolution
- Evaluate the economics of each part of the LNG value chain and the profitability for investments in the LNG industry
- Analyze the basic structure of LNG contracts

Pedagogical & technical resources

- Quizzes
- Videos
- Examples of contracts
- Exercises on LNG contracts

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
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Program

GLOBAL GAS SCENE & LNG MARKETS — 1 day

Natural Gas uses, reserves, supply and demand.
New outlets for LNG (retail LNG).
International gas trades and importance of the LNG.

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Evolution of the LNG trading and pricing.
Main LNG markets: America, Europe and Asia (mature markets: Japan and South Korea and emerging markets: China, India...).
Risks for the different LNG actors: liquefaction, shipping, portfolio players, buyers...
Unconventional gas and its impact on LNG markets.

TECHNICAL & ECONOMIC ASPECTS OF THE LNG CHAIN — 1 day

LNG: properties and specifications.
Design of the different parts of the LNG chain.
Liquefaction plants, LNG tankers, regasification terminals.
Main projects of LNG terminals in the world and their exploitation.
Capital expenditures and operating costs.
Economic evaluation of a LNG project.
Business structures of LNG projects:

- Classical “Buy/Sell” model.
- Processing model.

New trends in the LNG industry:

- Floating concepts: FLNG, FSRU.
- Small scale LNG.

LNG CONTRACTS — 1 day

Main features and important articles in LNG contracts.
LNG pricing: price formulae, indexation and net-back value.
Tolling agreements.
Impact of gas markets liberalization and third-party access to regasification terminals.
Coexistence between long-term contracts and short-term contracts.

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Training - Electrical Motors: Technology, Operation and Maintenance

EIMEA-EN-P | **Face-to-face only** | **5 days**

This course focuses on the technical development of industrial electrical motors

Level
Skilled

Public
Electrical and mechanical engineers, supervisors, technicians involved in electrical motors maintenance and operation

Objectives
Attendees will be able to implement the following skills:

- Explain how electric motors work
- List the main malfunctions
- Specify the diagnostic tools in use
- Explain repair and inspection techniques

Pedagogical & technical resources

- Visit of a motor repair workshop (when possible)
- Interactive course
- Motor disassembly and assembly in case of an available workshop

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OPERATION PRINCIPLE & TECHNOLOGY — 2 days

Working principle of induction and synchronous motors.
Features: power, current, torque and power factors.
Technology and main parameters.

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Protective modes in regards with external environments: temperature classes, protection class index, hazardous area motors, ATEX protection.
Electrical and thermal protection of the motor as well as the use of temperature sensors.
API 541 asynchronous guidelines for refinery and petrochemical motors.
Efficiency motor's standards IEC 60 034-30/IEEE 112.

VARIABLE SPEED FEATURES — 1 day

Power and HV/LV range, fields of use and typical applications.
Speed and motor control as well as network consequences. Synchronous motor: torque control and various technologies.
Induction motor: standard starting methods depending on mechanical load, motor power and network capacity; limiting conditions due to the grid; number of start constraints. Electronic starting method (soft starter).

INSTALLATION — 0.5 day

Main characteristics and constraints for a motor installation.
Skid and shim. Shaft alignment. Comparison to reference datasheets. Vibration footprint.

FAILURE DIAGNOSIS IN OPERATION — 0.5 day

Bearings: temperature, vibration, lubrication monitoring.
Mechanical failures.

CONTROL & REPAIR TECHNIQUES - PRACTICAL WORK — 1 day

Part identification in workshop.
Bearings assembly, housing repair, clearance and run-out checks.
Electrical insulation and phases balancing checks.
Impact of frequency inverters and harmonics on electrical coils insulation and the bearings.
Coil insulation repairs: vacuum coils impregnation, technology and quality. Rewinding and coils positioning according to magnetic circuit's notches. Electrical checks (electrical resistance, insulation, polarization...).
Balancing: quality standards, unload and load tests. Repair specification: specification content as well as work acceptance.
Visit of a motor repair workshop (when possible).

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Training - Energy Efficiency and Low Carbon Strategy, Industrial Solutions

ELCS-EN-P | **Face-to-face only** | **5 days**

As part of adapting their activities to the energy transition, industrial companies, particularly oil and gas firms, will need to manage CO_2 emissions and actively participate in the energy transition. This training focuses on the main challenges industries will face, both in transitioning to low-carbon energy consumption and in increasing energy efficiency. These companies will need to integrate new energies (renewables, hydrogen, etc.) into their energy mix. Furthermore, CO_2 economics must be considered when implementing their low-carbon plans

Level

Knowledge

Public

Industrial operators and national (NOC) or international (IOC) oil and gas companies. It is suitable for technical managers as well as executives and managers at all levels.

Objectives

Attendees will be able to implement the following skills:

- Integrate the new energy landscape with strategies to reduce carbon footprint
- Understand the evolution of the renewable energy sector and opportunities in this field
- Assess energy efficiency and manage its improvement potential
- Develop CCS and CCUS opportunities in future or existing projects
- Implement a roadmap for decarbonizing industrial facilities considering CO2 economics

Pedagogical & technical resources

- Questionnaires
- Team games
- Case studies
- Calculations using economics and KPIs

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

GLOBAL ENERGY LANDSCAPE — 0.5 day

Energy basics: definitions, characteristics, units, conversion factors, orders of magnitude.
Oil chain: technologies, supply and demand, prices, reserves, transition scenarios.
Gas chain: technologies, market players, producing and consuming countries, economic issues.
Case study: crude oil price.

CARBON, CLIMATE AND ENERGY STRATEGY — 0.5 day

Current scientific observations. Evolution of greenhouse gas emissions.
Other planetary environmental limits. Energy mix and CO_2 intensity of energy sources.
Case study: European energy mix. Energy trilemma concept.
Emission distribution by economic and geographic sectors. Oil & gas sector outlook in the energy transition: IEA scenarios, societal pressure, stranded asset risks.
Case study: production decline and oil investment pace.
Public actor mobilization, North-South debate, just transition concept.
Consumer mobilization. Global strategy for decoupling economic growth and carbon emissions. Debate and case study on transition scenarios.

DECARBONIZED INDUSTRIAL SOLUTIONS — 1 day

Global statistics review. Massive rise of renewables. Collapse of solar, wind, and battery costs. Shortened investment cycles, societal barriers, grid transmission impacts. Cross-over of global investment curves: green vs fossil energy.
Mixed results of a two-speed transition versus technologies and geographic sectors.
Overview of solar and wind energy. Presentation of main low-carbon sources: solar, wind, bioenergy, etc.
Case study: comparison of economic models for different electricity sources (solar, wind, gas). Economic concepts: capital cost, key performance criteria : net present value (NPV), internal rate of return (IRR), levelized cost of electricity (LCOE). Growth of competitive renewables without subsidies in the economic landscape. Practical examples.
Intermittency and energy storage: grid balancing constraints, technical and commercial challenges. Emerging solutions: hybrid projects, pumped hydro storage, utility-scale batteries. Emerging economic trends : new business models, emerging technologies, innovations.

CO2 ECONOMICS AND EMISSIVE INDUSTRIES — 1 day

State mobilization, carbon pricing markets (national/regional), European example. International economic implications, carbon market trends.
Industrial and economic actors mobilization. Corporate low-carbon strategies: role of carbon accounting (GHG Protocol). Case study for a SME, utilisation of ADEME database on emission factors in French economy. Key steps after carbon footprint assessment (emission reduction targets, action plan, integration into low-carbon strategy).
Target sectors, “hard-to-abate” industries, persistent supply-demand challenges. CCUS value chain: examples of CCS projects in Europe and the USA, costs trends, sectors applicability, impact of carbon footprint.
Technological and economic barriers to CCUS deployment, industry deployment status in France.
Hydrogen value chain: current supply and demand, hydrogen “colors” (grey, green, blue, etc.), technological and economic barriers to hydrogen economy.

LOW CARBON STRATEGY AND ENERGY EFFICIENCY — 1 day

Electrification of demand. Growth of low-carbon energy supply and electrification of demand across various sectors Case example of Global South and Sun Belt countries. Technological levers for global energy efficiency.
Gas vs renewables: competition and complementarity. Critical minerals challenge for energy transition. Environmental, economic, and geopolitical barriers.
Efficiency levers for residential, commercial, and industrial heat. Heat pump technology: residential, urban, industrial applications, technical limits. Regulatory and economic barriers.
Thermal storage technologies: practical examples and applications.

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LOW CARBON STRATEGY FOR THE OIL & GAS INDUSTRY — 1 day

Energy independence goals of importing countries as a transition driver. Impact of China's electric mobility revolution on fuel demand reduction. Oil & gas sector adaptation: examples from major companies, diverse strategic approaches.
The challenge of methane emissions and flaring reduction: differentiation by actors (majors, independents, NOCs, mining companies, utilities) and countries in their power to influence the outcome.
Emission management systems: typical emission reduction plan format for oil & gas companies.
Technological levers for operational optimization and facility design, flaring reduction, methane elimination, CCUS projects, energy efficiency, renewable energy use.
Examples and case studies with economic calculations.

Sessions

Rueil-Malmaison - From 12/07/2026 to 12/11/2026 — **4470 €/HT**

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Training - Introduction to Industrial Electricity

ELECBAS-EN-P | Face-to-face only | 5 days

This course provides an overview on industrial electricity; how it is generated and distributed in petrochemical plants

Level
Awareness

Public
Operators, supervisors and engineers from any department

Objectives
Attendees will be able to implement the following skills:
- List the fundamentals of electricity
- Identify equipment used for the grid
- Recognize electric motors and generators technologies
- List the electrical safety rules

Pedagogical & technical resources
- Numerous drawings and datasheets used in the industrial plants
- Daily quiz to reactivate the key points
- Practical exercises and case studies

Assessment of achievements
- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS IN INDUSTRIAL ELECTRICITY — 1 day

Characteristics of electrical power supply for industrial plants.
Principles of electrical distribution:
- Main technical characteristics of the electrical distribution and the grid. One line electric distribution diagram.
- Application: overall online diagram.

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SUBSTATION EQUIPMENT & SWITCHGEAR — 2 days

Purposes and use of these types of equipment.
Transformers: overall technology and troubleshooting.
Circuit breakers: technology and switchboard.
Operation and maintenance of main electrical equipment.
Electricity control system. Failures monitoring and corrective actions.
Electrical protections.

ELECTRICAL HAZARDS — 1 day

Electrical shocks. Direct and indirect contacts.
Collective and personal protective equipment. Hazardous areas. Basics in safety.
Prevention against electrical shocks, Lock-Out Tag-Out procedure (LOTO).

INTRODUCTION TO MOTORS — 0.5 day

Different type of motors. Operation and technology. Working principle of induction and synchronous motors.
LV & HV motors. Troubleshooting.

DESCRIPTION OF STEAM TURBINES GENERATORS — 0.5 day

Electrical power generating set. Technology. Coupling.
Main technical characteristics of these types of equipment.

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Training - Electrical Maintenance for Industrial Plants

ELECMAI-EN-P | **Face-to-face only** | **5 days**

This course provides a better understanding of electrical equipment such as generators, motors and power grids. It includes performances, operation, maintenance, hazards and safety

Level
Skilled

Public
Electrical technicians, supervisors and inspectors, operation and maintenance staff as well as reliability engineers

Objectives
Attendees will be able to implement the following skills:

- Understand a plant grid and its structure
- Master electrical equipment including motor operating principles
- Detect the main disturbances and failures related to electrical motors
- List the main maintenance procedures on these types of equipment
- Understand the roles of the safety parts

Pedagogical & technical resources

- Drawings and datasheets used in the industrial plants
- Practical exercises and case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CHARACTERISTICS OF PLANT ELECTRICAL DISTRIBUTION — 0.5 day

Purpose of electrical distribution, characteristics of the grid. One line electrical diagram.
Main grid, auxiliary grid, safety grid. Application to a typical grid.

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SUBSTATION EQUIPMENT & WORKING PRINCIPLE OF SWITCHGEAR - MAINTENANCE — 2 days

Purposes and uses of equipment, as well as its first level maintenance.
Operation and technical characteristics.
Transformers: purpose of transformer on a power grid; operating principle, single phase to tri phases; windings connection and protections. Preventive maintenance.
Circuit breakers: operating principle, technologies, main failures.
Cables, switchboards, equipment, relays, diesel generators, batteries, chargers and UPS. Equipment monitoring.
Gas insulated substation: principle and technology.

SAFETY EQUIPMENT & RELIABILITY — 1 day

Main types of protections. Earthing system choice LV&HV: advantages and drawbacks.
Selectivity of protections: mains techniques. Protection relays. Insulation monitoring.
Hazardous area (ATEX) equipment: standards and maintenance rules.
LockOut - Tag-Out procedures (LOTO).

INDUCTION & SYNCHRONOUS MOTORS — 1 day

Operation and technical characteristics (intensity, efficiency, power factor and torque).
Field of use of power and voltage range HV & LV. Technology and hazardous area (ATEX).
Variable speed drive, type of drives; consequences on the grid. Electrical protection of motors.
Synchronous motors: torque control, excitation, different technologies.
Induction motors: various types of starting according to the mechanical load and power of the motor.
Constraints from the grid; maximal numbers of launches. Applications and case studies.

STEAM TURBINES GENERATORS — 0.5 day

Main parameters of the steam turbine generator. Technology and operation of the electrical generator.
Isolated mode and coupling of the generator: impact on the grid.
Application: maintenance case studies.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
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Training - Rotating machinery electrification

ELECMT-EN-P | Face-to-face only | 2 days

This course explains how to assess the efficiency of a rotating machinery (pump, compressor) electrification project, in order to achieve savings in fuel consumption and as a result equivalent CO2 emissions to atmosphere

Level
Skilled

Public
Engineers and technicians involved in rotating machinery electrification projects

Objectives
Attendees will be able to implement the following skills:

- Explain how to calculate the work and the power of a rotating machine
- Explain how to select an electrical motor
- Explain how to assess the benefits of such an electrification project

Pedagogical & technical resources

- Interactive course
- Case studies coming from actual situations.

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ROTATING MACHINERY WORK AND POWER — 1 day

Pumps and compressors

- Basics of construction.
- Hydraulics and gas compression basics
- Application: work and power calculations/on-site checks

Drivers: electrical motors, diesel engines, gas turbines, steam turbines, expanders

- Basics of construction.
- Combustion and gas expansion basics
- Application: work and power calculations/on-site checks

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ROTATING MACHINERY ELECTRIFICATION 1 day

Pumps and compressors of various sizes electrification case studies, allowing:

- The calculation/check of the required works and powers
- The assessment of the project benefits, in terms of: fuel consumption savings, CO2 emissions to atmosphere savings, footprint savings...

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This training course is offered under the **Alliance4Training** brand

Training - Electrical Technicians

ELECTEC-EN-P | **Face-to-face only** | **35 days**

Improve electrical technicians performance in safety, quality and work efficiency. This course will provide an IFP Training Certificate according to the IFP Training procedures

IFP Training Certificate

Advanced Certificate

Level

Skilled

Public

Electrical technicians from refineries and petrochemical plants

Objectives

Attendees will be able to implement the following skills:

- Apply electrical safety rules
- Identify equipment used for the grid
- Perform checks in workshop and on the plant
- Explain electric motors and generators technology
- Write/validate electrical maintenance procedures

Pedagogical & technical resources

- Training split into thematic modules and "On The Job Training" (OJT). To give participants the opportunity to better assimilate the content of the previous course modules, and apply the studied subjects to the facilities
- Workshop practice
- Exercises on site
- Intermediate and final tests to evaluate trainee according to IFP Training certificate procedure

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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MODULE 1: ELECTRICITY FUNDAMENTALS, PROCESS & SAFETY — 5 days

Electricity fundamentals. Voltage. Intensity. Power. Ohm law. Main characteristics of cables and wirings.
Process and electrical equipment: process constraints due to electrical power supply; introduction to electrical drawings.
Physics: pressure, force, temperature and electrical units used in Oil & Gas processes. Main physical parameters of high voltage cells.
Safety at work: general hazards and electrical risks in a petrochemical plant; electrical hazardous area; protections layers concept; work permit and prevention. Application on an electrical equipment maintenance.

MODULE 2: INDUSTRIAL ELECTRICITY BASIS - PLANT ELECTRICAL NETWORK & GRID — 5 days

Main parameters of an industrial electrical power supply. Electrical distribution drawings. Existing electric distribution diagram and grid. Wiring and connecting switchgear inside electrical cabinets. Replace/repair an equipment in a cabinet. Checks and inspection.
Practical works in a workshop according to available equipment.
Hazards: electrical shocks, direct and indirect contact, collective and personal protective equipment, hazardous areas.
Mini-study (1 day team work) for an assigned electrical system: detail specific hazards and barriers, critical process variables, critical pieces of equipment and critical operations.

MODULE 3: ELECTRICAL HAZARDS - ATEX - LOCKOUT/TAG-OUT PROCEDURES — 5 days

Electrical protection: electrical hazards for human body and material; equipotential connections, grounding protection. Fuses - Circuit breakers - Selectivity of protections: main techniques. Protection relays. LV & HV earthing system: protections and preventive measures. Reliability and safety.
Different voltage magnitude. Hazardous area and different electrical equipment installed in ATEX zones; maintenance constraints.
Electrical authorizations - Role and commitments related to work permits.
Lock Out & Tag Out rules before and after maintenance works. Case study and practical works on a switchgear.
Mini-study (1 day) for an assigned electrical substation: identify the grounding system & the possible existing defaults.

MODULE 4: ON THE JOB TRAINING 1 (ELECTRICAL NETWORK) — 5 days

OJT:

- Application of the previous module(s) content to the actual plant.
- According to a subject submitted by the lecturer, the trainees will be requested to prepare a written report and 20 minutes presentation about “Electrical Network”: safety (work permit, risk analysis, safeguards...); detailed network and grid; results analysis (accuracy, acceptance criteria...).
- The trainee will present its work to other trainees and lecturer during other modules.

MODULE 5: ELECTRICAL MAINTENANCE — 5 days

Electrical distribution monitoring: main, auxiliary and safety grid; inspection and failure detection systems; LV & HV cells (standards and technology); maintenance procedures.
Transformers: overall technology, troubleshooting, operating and maintenance procedures; winding connections.
Circuit breakers: technology and switchboard; maintenance, replacement and settings.
Practical works: racking-in/out procedures; main parameters of cables, switchboards, relays, diesel generators, batteries, chargers, UPS.
Steam/gas turbines generators: voltage control and excitation systems; impact of the generator coupling on the grid.
Application: electrical parts replacement and malfunction consequences.
Practical works: applications are performed on representative operating technical substation.

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MODULE 6: ELECTRICAL MOTORS (MAINTENANCE & INSPECTION) 5 days

Technology: working principle of an induction and synchronous motors; features (power, current, torque and power factors); protective modes vs. external environment (temperature classes, protection class index, hazardous area motors, main “EEx” protection); electrical and thermal protection.
Variable speed technology: motor power and network capacity, limiting conditions due to the grid; number of starts.
Control and repair techniques: bearings, lubrication control; main mechanical failures.
Coil insulation repairs: technology and quality; electrical tests (electrical resistance, insulation, polarization...).
Practical work: dismantling of a LV motor; inspection, electrical insulation checks; reassembly the motor.
Visit of a motor repair workshop (if possible): identification of main components on existing motor equipment.

MODULE 7: ON THE JOB TRAINING 2 & FINAL TEST (ELECTRICAL MAINTENANCE) 5 days

OJT (3 days)

- Application of the previous module(s) content to the actual plant. The subject is submitted by the lecturer.
- At the end of the OJT period, the trainees will be requested to prepare a written report and 20 minutes presentation about “Electrical Maintenance”: safety (work permit, risk analysis, safeguards...); topics studied during the previous modules; results analysis (accuracy, acceptance criteria...).

Final test (2 days)

- Presentation of OJTs to the classroom.
- Written test about all the training contents according to the IFP Training Certification procedure.

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Training - Environmental Management

ENVMGT-EN-P | Face-to-face only | 5 days

This course provides a thorough and applied knowledge of best industry standards and practices for appraising environmental matters throughout the life cycle of a field development, to implement the management of impact and risks throughout the life cycle of a project from exploration up to abandonment

Level

Knowledge

Public

Managers, advisors, engineers, and operations staff involved in management of environmental issues all along the lifetime of a field development

Objectives

Attendees will be able to implement the following skills:

- Explain the fundamentals of environmental management in terms of risks and impacts
- Describe techniques, fundamentals and contents of environmental impact assessments
- Identify mitigation measures
- Select key performance indicators, and set up environmental management plans
- Explain the content of an oil spill contingency plan

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS OF ENVIRONMENTAL MANAGEMENT — 0.5 day

Why environmental management is necessary. Concept of sustainability.
Definitions: environmental impact, significance, accidental vs. operational discharges, discharge and pollution.
Legal standards: definition, standard determination. Best available technology. Best environmental practices.

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Environmental Quality Standards (EQS), discharge standards - Regional, international, conventions.
Introduction to social management.

ENVIRONMENTAL, SOCIAL & HEALTH IMPACT ASSESSMENT — 1 day

Risk assessment: concept of hazards, risks, hazard identification and risk assessment process.
Impact assessment throughout the lifecycle of the project.
Aspect and potential impact identification.
Sources of environmental information.
Impacts on atmosphere: air pollution, GHG emissions.
Impacts on aquatic resources: water pollution and water availability.
Impacts on land resources: ground pollution and land use.
Impacts on biodiversity.
Socio-economic and cultural impact.

ENVIRONMENTAL MANAGEMENT PLAN — 0.75 day

Concept and elements.
Control measures to reduce air emissions.
Control measures to reduce water consumption and water pollution.
Control measures to reduce land pollution and use.

MONITORING & REPORTING — 0.5 day

Key performance indicators, Industry performance - Trends.
Environmental monitoring and surveillance.
Green house gases estimation and reporting.

WASTE MANAGEMENT PLAN — 0.5 day

Strategy - Type of waste.
Waste collection.
Transport and storages (primary, final...).
Treatments options (biological, thermal desorption).

MANAGEMENT OF ENVIRONMENTAL EMERGENCIES — 0.75 day

Identification of spill scenarios.
Oil spill contingency planning strategies: onshore and offshore cases.
Typical resources for oil spill contingency plans.

STAKEHOLDERS ENGAGEMENT — 0.25 day

Stakeholders identification.
Engagement and information process.
Stakeholders engagement plan review.

ENVIRONMENTAL MANAGEMENT SYSTEM — 0.5 day

Elements of environmental management systems.
Referentials and certification. ISO 14001.
EMS as part of integrated management systems.
Environmental culture and leadership in the organization.

ENERGY MANAGEMENT — 0.25 day

Introduction to energy sources.
Energy efficiency. Measures for improvement.

Sessions

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Pau - From 11/02/2026 to 11/06/2026 **4360 €/HT**

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Training - Environmental and Social Risk Management

ENVSOC-EN-P | Face-to-face only | 5 days

This course provides a thorough and applied knowledge of best industry standards and practices for appraising environmental and social matters that need to be handled cautiously throughout the life cycle of an upstream project, from design to construction and operation of Oil & Gas processing facilities

Level

Knowledge

Public

Managers, advisors, engineers and operations staff involved in oversight or management of environmental and social issues all along the lifetime of an upstream project

Objectives

Attendees will be able to implement the following skills:

- Understand the global prevailing context for the Oil & Gas industry
- Grasp legal requirements and standards with respect to impact on local environment and populations
- Understand techniques and contents of environmental and social impact assessments
- Identify mitigation measures, perform stakeholders' mapping and build public consultation and disclosure plans
- Select key performance indicators, and set up monitoring with environmental and social management plans

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENVIRONMENTAL ISSUES RELATED TO E&P ACTIVITIES — 0.25 day

Historical overview of impact awareness, management.
Definitions: environmental impact, significance, accidental vs. operational discharges, discharge and pollution.

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THE STAKES — 0.75 day

Environmental issues: local, regional, global.
Air, water (availability, pollution), biodiversity, wastes.
Kyoto protocol, carbon dioxide accounting, cap and trade, clean development mechanisms.
Toxicity, ecotoxicity.

ENVIRONMENTAL RISK ASSESSMENT (ERA), LEGAL REQUIREMENTS/LEGAL STANDARDS: NATIONAL, REGIONAL, INTERNATIONAL — 0.25 day

Environmental Risk Assessment (ERA).
Legal standards: definition, standard determination, best available technology, best environmental practices.
Environmental Quality Standards (EQS), discharge standards - Regional, international, conventions.

ENVIRONMENTAL IMPACT ASSESSMENT - PROJECTS — 0.5 day

Environmental impact assessment activities throughout the life cycle of a field, tools used for impact prediction.
The EIA process, scoping an EIA, ENVID (Environmental Hazard Identification), environmental management plan. Case study.

ENVIRONMENTAL RISK MANAGEMENT - PRODUCTION ACTIVITIES — 0.5 day

HSE MS - EMS (ISO 14001), continuous improvement processes.
Key environmental procedures: wastes management, chemical management, monitoring.
Oil spill contingency planning.

MONITORING & REPORTING — 0.5 day

Key performance indicators, industry performance - Trends.
Environmental monitoring & surveillance.
Green house gases estimation and reporting.

ENVIRONMENTAL RISK MANAGEMENT - ABANDONMENT — 0.25 day

SOCIAL ISSUES RELATED TO E&P ACTIVITIES: THE RISKS, THE STAKES & THE STRATEGIES — 0.5 day

The risks and the stakes. Some high profile cases (human rights, NGOs activism, etc.).
Documentary viewing and discussion on social risks in E&P activities.
How to change practices and image?

PARTICIPATIVE SOCIAL IMPACT ASSESSMENT AS A RISK MANAGEMENT TOOL — 0.5 day

Participative social impact assessment: definition, business case and standards, process.
Social management plans and monitoring. Focus on special topics: involuntary resettlement, local communities, business in conflict zones.

STAKEHOLDER ENGAGEMENT — 0.5 day

Stakeholder engagement: definition and business case.
Public consultation and disclosure plan (steps and techniques).
Stakeholder mapping.
Stakeholder engagement: misguiding assumptions and key success drivers.

CASE STUDY: SOCIAL SCREENING OF AN OIL & GAS PROJECT — 0.5 day

Based on a group work, participants should prepare a:

- Stakeholder mapping.
- Social impacts identification and mitigation plan.

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Training - Overview of Petroleum Economics within the Energy Transition

EPE-EN-P | Face-to-face only | 4 days

This course aims to provide an overview of the petroleum sector so that participants may understand the oil operations and business, from upstream to downstream, and identify economic challenges

Level

Knowledge

Public

People from the energy and petroleum sectors, industrial partners, business men and financiers, as well as public administration staff

Objectives

Attendees will be able to implement the following skills:

- describe the different types of energy resources, the supply and demand with the challenges of the oil sector in the energy transition and its actors strategy
- describe the main steps of the upstream sector with the distinction for the different types of oil contracts
- explain the main economic criteria to evaluate a project and understand the operation of the physical and financial oil markets
- explain the evolution of the refining sector and of the petroleum product markets

Pedagogical & technical resources

- Quiz and serious game on the fundamentals of the energy sector
- Case study on the economic evaluation of an E&P project
- Exercises on cargo transportation costs, hedging, and refining margins
- Team games on factors affecting crude prices, the upstream sector, and oil trading

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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INTERNATIONAL ENERGY SCENE : OIL AND TRANSITION — 1 day

Energy resources: definition, characteristics, conversion factor.
Energy demand and supply: evolution factors (reserves, technology, etc.) and scenarios.
History of the oil industry.
Determinants impacting crude oil prices today.
Strategies of actors: producer and consumer countries, national, independent and international oil companies, international organizations (OPEC, IEA, etc.).
Financial and political stakes, geographical and environment constraints.
Outlook for the oil sector in the energy transition: IEA scenarios, societal pressure, risk of stranded assets, risks for producing countries.

UPSTREAM — 1 day

Stages and technico-economic aspects of the Exploration-Production.
Reserve evaluation.
Economic criteria and evaluation method of an oil project.
Oil contracts and principle of the oil rent sharing.

MIDSTREAM — 1 day

Business practices and pricing.
Physical markets (spot, forward): operation, reporting agencies.
Introduction to incoterms.
Pricing a cargo, freight rates.
Financial markets (futures): operation, hedging.

DOWNSTREAM — 1 day

Refining processes and units.
Refining capacities, projects, strategies of actors.
Economic aspects of the refining sector: investments, costs and margins.
Environmental constraints, alternative fuels.
Petroleum product markets and marketing.

Sessions

Rueil-Malmaison - From 11/24/2026 to 11/27/2026 — **3130 €/HT**

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Training - Petroleum Engineering

EPETROL-EN-P | Face-to-face only | 100 days

This course provides in-depth technical knowledge of Oil & Gas production in order to hold rapidly, and very effectively, the position of field engineer, design engineer, or project engineer

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers (particularly recently graduated engineers or engineers in conversion) looking to acquire in-depth knowledge and best practices of Oil & Gas production

Objectives

Attendees will be able to implement the following skills:

- Grasp fundamentals of reservoir engineering and drilling
- Explain well completion and servicing, well performance and artificial lift
- Understand fundamental concepts underlying Oil & Gas processing
- Understand in detail operating conditions and basic design of oil, water and gas treatment
- Describe technology of static equipment and rotating machinery used in production facilities
- Explain offshore development techniques and flow assurance issues
- Identify main risks related to Oil & Gas production operations and review safety engineering best practices
- Contribute to the dynamics of field development projects studies
- Explain main contracts in E&P and assess project profitability

Pedagogical & technical resources

- Highly interactive training with industry specialist lecturers
- Multiple teamwork sessions and industrial case studies
- Numerous process simulation exercises using PRO/II™ software
- Final 10-day group project on a real field development case study, result of which are presented to a jury

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

INTRODUCTION TO PETROLEUM GEOSCIENCES — 5 days

Elements & processes of petroleum systems. Exploration tools (seismic & well data). Prospect evaluation.

INTRODUCTION TO RESERVOIR CHARACTERIZATION — 5 days

Reservoir architecture. Geological characterization. Reservoir heterogeneities.

INTRODUCTION TO RESERVOIR ENGINEERING — 5 days

Reservoir engineering workflow. Petrophysics/rock properties. PVT. Well testing. Drive mechanisms.
Case study: field development plan.

DRILLING FUNDAMENTALS — 5 days

Drilling operations. Architecture of the well & completion.

WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE — 5 days

Well productivity. Reservoir wellbore interface implementation.

ARTIFICIAL LIFT & WELL INTERVENTION FUNDAMENTALS — 5 days

Artificial lift: gas lift, ESP. Types and means of intervention on producing wells. General procedure of a workover.
Case study.

WELL CONTROL — 5 days

Introduction to well control methods. Equipment. Wireline, coiled tubing, snubbing.

THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING — 5 days

Well effluent. Gas compression and expansion. Liquid-vapor equilibrium of pure components and mixtures.
Mixture separation.

OIL & WATER TREATMENT — 5 days

Crude oil treatment: stabilization, dehydration, sweetening. Reject and injection water treatment.

GAS PROCESSING & CONDITIONING — 5 days

Gas processing: dehydration, sweetening, NGL recovery. Fundamentals of Liquefied Natural Gas (LNG) chain.

STATIC EQUIPMENT & SCHEMATIZATION — 5 days

Piping & valves. Storage equipment. Thermal equipment. Flow assurance. Schematization.

ELECTRICITY & INSTRUMENTATION — 5 days

Electrical power generation and distribution network. Instrumentation and process control. Safety Instrumented Systems.

METERING - MATERIAL BALANCE - ALLOCATION — 5 days

Data treatment. Transactional metering of liquids and gases. Multi-phase metering.
Liquid & gas material balances. Production reporting.

ROTATING MACHINERY — 5 days

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Centrifugal and positive displacement pumps. Centrifugal and reciprocating compressors. Turbo-expanders. Gas turbines.

OFFSHORE FIELD DEVELOPMENT - FLOW ASSURANCE — 5 days

Offshore development architecture. Technology & deep offshore specificities. Pipelines. Flow assurance issues.

SAFETY & ENVIRONMENT IN SURFACE PROCESSING FACILITIES — 5 days

Hazards and risks in production operations. Safety in production operations and during construction or maintenance works. HSE management.

SAFETY ENGINEERING — 5 days

HAZID application, HAZOP exercise, plant layout exercise. QRA and consequence analysis methodology. SIS and relief systems design.

PETROLEUM ECONOMICS & PROJECT MANAGEMENT — 5 days

Fundamentals of contracts. Project profitability evaluation. Risk analysis of Exploration & Production projects. Project cost estimation and cost control.

FIELD DEVELOPMENT PROJECT - JURY — 10 days

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This training course is offered under the **Alliance4Training** brand

Training - HSE in Surface Production Operations

EPSAFOP-EN-P | **Face-to-face only** | **5 days**

This course provides a thorough understanding of risks and safety measures related to products, equipment and different operations in Oil & Gas production facilities

Level

Knowledge

Public

Engineers and staff involved in operating Oil & Gas field production facilities

Objectives

Attendees will be able to implement the following skills:

- Deepen knowledge of hazards involved in routine operations, SIMOPS and shutdown/start-up operations
- Assess risks involved in different operations and adopt best industry practices
- Adopt the most appropriate safety measures in routine Oil & Gas processing operations and when faced with unforeseen events
- Explain key safety management rules leading to high HSE standards

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OPERATIONS & HSE — 0.25 day

Hazards and risks incurred. Consequences.
Risk management means: equipment, organizational and human aspects.

MAIN HAZARDS OF HYDROCARBON PROCESSING — 0.75 day

Flammability: flame ignition and propagation principles. Types of combustibles, oxidizers and most common

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ignition sources in process facilities.
Toxicity: exposure limits. Specific hazards associated to H2S. Use of Safety Data Sheet (SDS).
Fluid behavior and related hazards: vessel pressure, consequences of temperature variation (thermal expansion, vaporization, vacuum, water hammer).
Fundamentals of pressure relief equipment: pressure relief valves, rupture disks, vacuum protection, flame arrestors.

RISK ASSESSMENT TOOLS - JOB SAFETY ANALYSIS — 0.5 day

Fundamentals of risk assessment process.
Job Safety Analysis (JSA) procedure and steps.
JSA exercise.

PERMIT TO WORK SYSTEM PROCEDURE — 0.5 day

Permit To Work (PTW) system. Objectives. Roles and responsibilities.
Main elements of PTW system. Typical approval process and information flowchart.
Master permit and associated certificates.
Management of shift and rotation handover. Permit renewals.
New technologies applied to PTW system. Digital PTW.

SAFE ISOLATION OF PLANT & EQUIPMENT — 1.5 days

Management of isolations.
Lock-out/tag-out procedure.
Steps of process isolations.
Degassing-inerting: steam, nitrogen, water, vacuum, work permits...
Risks associated to operations of depressurization and drainage toward: flare, slops, tanks, oily water.
Start-up: checks, accessibility and cleanliness, line up, deaeration, seal tests, oil in.
Personal Protective Equipment (PPE).

HSE IN MAINTENANCE & CONSTRUCTION WORKS — 0.5 day

Risks associated to construction and maintenance works:

- Lifting and rigging operations.
- Access and working in confined space. Ventilation and atmosphere analysis: oxygen content explosivity, toxicity.
- Works at height: ladders, scaffolding, mobile elevated working platforms...
- Safe use of tools.
- Radioactive sources.

ORGANIZATIONAL FRAMEWORK - HUMAN FACTORS — 0.5 day

Introduction to HSE management system.
SIMultaneous OPerations (SIMOPS) management.
Management of change.
Downgraded situations.
Human factors in risk management.

ENVIRONMENTAL MANAGEMENT IN FIELD OPERATIONS — 0.5 day

Main concepts.
Tools to manage sustainability.
Potential environmental impacts in field operations.
Sustainability reporting. Introduction to regulatory framework.

Sessions

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Pau - From 10/05/2026 to 10/09/2026 **4360 €/HT**

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Training - HSE in Maintenance and Construction Activities

EPWORK-EN-P | **Face-to-face only** | **5 days**

This course provides a thorough understanding of risks related to products, equipment and different operations involved in the execution of construction/maintenance works

Level

Knowledge

Public

Engineers, technicians and operators involved in the supervision of construction and maintenance of Oil & Gas field processing facilities

Objectives

Attendees will be able to implement the following skills:

- Identify the hazards and assess the risks associated to a construction/maintenance work
- Describe the main elements and responsibilities of the Permit To Work (PTW) system
- Identify the environmental impacts of the activity and to plan the appropriate mitigation measures
- Identify the main HSE challenges associated with the management of contractors
- Lead a team carrying out a safety audit of construction/maintenance works

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OPERATIONS & HSE — 0.25 day

Hazards and risks incurred - Consequences.
Risk management means: equipment, organizational and human aspects.

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MAIN HAZARDS OF HYDROCARBON PROCESSING — 0.5 day

Flammability: flame ignition and propagation principles; types of combustibles, oxidizers and most common ignition sources in process facilities.
Toxicity: exposure limits; specific hazards associated to H2S; use of Safety Data Sheet (SDS).
Fluid behavior and related hazards: vessel pressure, consequences of temperature variation (thermal expansion, vaporization, vacuum, water hammer).

RISK ASSESSMENT TOOLS - JOB SAFETY ANALYSIS — 0.5 day

Fundamentals of risk assessment process.
Job Safety Analysis (JSA) procedure and steps.
JSA exercise.

PERMIT TO WORK SYSTEM PROCEDURE — 0.5 day

Permit To Work (PTW) system. Objectives. Roles and responsibilities.
Main elements of PTW system. Typical approval process and information flowchart.
Master permit and associated certificates.
Management of shift and rotation handover. Permit renewals.
New technologies applied to PTW system. Digital PTW.

HAZARD IDENTIFICATION & RISK ASSESSMENT OF MAINTENANCE & CONSTRUCTION WORKS — 1.5 days

Risk assessment and recommended mitigation measures associated to:

- Lifting: manual and mechanical.
- Work at height/over water/diving.
- Use of tools: sand blasting, lifting, chemical and HP cleaning, hydraulic tests, flexible pipes, welding tools, milling...
- Radioactive sources: hazards, markers, use.
- Electrical equipment: electrical classes, hazards, habilitation, consignation, personnel protection.
- Confined space works: ventilation, gas detection, oxygen content of air, penetration, evolution of hazard during works, supervision.
- Hydrostatic testing.
- Welding/grinding/cutting.

ENVIRONMENTAL MANAGEMENT IN MAINTENANCE & CONSTRUCTION OPERATIONS — 0.25 day

Main concepts.
Potential environmental impacts in maintenance and construction operations.
Waste management principles and strategies for planning and implementation.

ORGANIZATIONAL FRAMEWORK - HUMAN FACTORS — 0.5 day

Introduction to HSE Management system.
SIMultaneous OPerationS (SIMOPS) management.
Management of change.
Downgraded situations.
Human factors in risk management.

HSE MANAGEMENT OF CONTRACTORS — 0.5 day

Contractor management as a key element of HSE Management system.
Definition of elements for HSE contractor management from selection process to final performance evaluation.

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HSE risk assessment of contract scope.

AUDITS - MEANS OF IMPROVING THE HSE PERFORMANCE 0.5 day

Objectives of an audit.
Pre-audit preparations: audit boundaries, expectations, audit checklists, audit plans.
Audit: findings versus expectations.

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Training - Investment Profitability Studies for Energy Projects

ERP-EN-P | Face-to-face only | 3 days

This course provides a better understanding of the concepts behind the theory of capital budgeting, thus helps improving the analysis in investment profitability studies A number of computer case studies will be treated all along the course to apply the principles that are presented succinctly, which makes this course a very practical one

Level

Knowledge

Public

Economists, engineers and commercial staff concerned with decisions affecting medium and long-term cash flows, such as investment, disinvestment, acquisitions or leasing, who need to improve their understanding of the theory and practice of investment analysis in the energy sector

Objectives

Attendees will be able to implement the following skills:

- Develop computer models for the economic evaluation of Oil & Gas projects
- Incorporate specific financing plan through equity profitability analysis
- Incorporate the risk and uncertainty in the economic evaluation of Oil & Gas projects

Pedagogical & technical resources

Case studies simulated on computers

Assessment of achievements

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Prerequisites

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Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ECONOMIC EVALUATION CRITERIA — 0.5 day

Corporate finance, capital costs and discount rate of the company.
Construction of project cash flows schedule.
Economic criteria for project evaluation: net present value (NPV), internal rate of return (IRR), payback period, etc.

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Case studies: development of an oil field under concession.

GLOBAL PROFITABILITY ANALYSIS — 1 day

Methodology for assessing the global profitability of capital invested.
Impact of taxation and inflation in profitability investment studies.
Choosing an investment program with a limited budget, scarcity cost of capital.
Case studies: accelerating production project (EOR) project of upgrading a refinery (Hydrocracking unit).

ECONOMIC COST ANALYSIS — 0.5 day

Accounting cost vs. economic cost, after-tax cash outflows.
Total discounted cost, annual economic cost.
Economic depreciation, unit economic cost, optimal economic lifetime.
Cases studies: issues related to purchasing of equipment and definition of an optimal economic lifetime.

EQUITY PROFITABILITY ANALYSIS — 0.5 day

Financing Oil & Gas projects, project finance and B.O.T. structures.
Various financing plans and debt repayment.
Analysis of equity cash flows, return on equity capital, financial leverage.
Case studies: construction of LNG plant and gas pipeline projects with specific financing.

RISK ANALYSIS — 0.5 day

Introduction to risk analysis and risk discount rate: sensitivity analysis, Spider and Tornado diagrams.
Probability of success, economic risk analysis in oil exploration.
Economic study of an exploration project using Min, Mode and Max scenarios.
Case studies: valuation of a decision to acquire information (seismic or drilling) and pricing of an exploration bloc.

CASE STUDIES

Oil field development project.
Acceleration of production project with or without EOR (Enhanced Oil Recovery).
Isomerization vs. alkylation project.
FCC project (Fluid Catalytic Cracking).
Project of upgrading a refinery.
Hydrocracking unit project.
Polypropylene Plant Project.
LNG plant project with specific financing.
Gas pipeline project with specific financing.
Service station modernization project.
Gas-fired power plant project.
Valuation of a decision to acquire information (seismic or drilling).
Pricing of an exploration bloc.

Sessions

Rueil-Malmaison - From 04/01/2026 to 04/03/2026 — **2620 €/HT**

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Training - Project Cost Estimation and Control

ESTIM-EN-P | Face-to-face only | 5 days

This course provides a structured and comprehensive approach towards cost estimation and control of Oil & Gas projects

Level
Skilled

Public
Project engineers and managers, petroleum architects, cost/estimation engineers for new or existing facilities projects

Objectives
Attendees will be able to implement the following skills:

- Technically define a project to provide a comprehensive cost estimate
- Perform estimates using a variety of methods and tools
- Apply the main cost control techniques used throughout the project execution

Pedagogical & technical resources

- Case studies from various projects
- Application for cost estimates on simple project

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OVERVIEW OF PROJECT — 1 day

Integration of global context of the project. Project types, project stages. Project management process reminder, including deliverables at each stage. Project initiation. Feasibility studies.
Preliminary project planning. Global schedule/constraints, cost estimate principles, main feasibility issues.
Overview of project cost estimating methods. Scope and exclusions. Cost management process. Definitions, cost references, AACE classes. Order of magnitude estimate. Direct and Indirect costs. CAPEX vs. OPEX.
Breakdown of the project according to the principle of Work Breakdown Structure (WBS)

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ESTIMATION DURING THE VARIOUS PHASES OF THE PROJECT — 2 days

Initial phase: Chilton factors, extrapolation method (comparison with similar projects). Typical accuracy and traps. Location factors.
Basic engineering/FEED: semi-detailed estimate, cost of main equipment and works. Owner costs. Key role of engineering studies, factored estimate.
Detailed studies: detailed estimate, use in the Project process. Elements needed for final approval by owner. Corrective factors.
Adjustments required to these methods in estimating the cost of revamping projects.

COST OPTIMIZATION — 0.5 day

Value analysis: functional breakdown of the project, technical and economic analysis of each part.
Economic evaluation of process and technical alternatives. Decision-making.

ASSESSMENT OF FINANCIAL RISKS & UNCERTAINTIES — 0.5 day

Project financial risk identification and quantification. Potential impact on cost estimate. Provisions. Upper limit. Typical values used per phase. Allowances and contingencies. Associated action plans. Particularities of cost estimation of brownfield projects.

COST CONTROL — 1 day

Overview of cost control process.
Definition, principles and objectives of cost control. Responsibilities of the project owner and engineering.
Cost monitoring report, frequency, consistency with WBS and project budget. Change management.
Forecasts and reporting.

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Training - Ethylene Compression and Hypercompression

ETHCO-EN-P | Face-to-face only | 4 days

This course provides a comprehensive understanding of ethylene compression related to compressors technology, operation and efficiency

Level
Skilled

Public
Engineers and technical staff (operation, maintenance and/or engineering) interested or involved in ethylene compression

Objectives
Attendees will be able to implement the following skills:

- Recognize ethylene compressor and hypercompressor technology
- Explain the compression of gases in hypercritical mode and the method of pre-dimensioning these machines
- List the monitoring points provided on these machines and the related operations
- Identify the typical failure modes of these machines, their causes, and associated remedies

Pedagogical & technical resources

- Study of actual cases based on industrial situations
- Various illustrations of actual systems
- Display of components of compressors

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ETHYLENE BEHAVIOR DURING COMPRESSION — 1 day

Ideal gas equation and implementation; isentropic compression; mass and volume capacity. Supercritical gas behavior.
Practical compression laws: discharge temperature, power of compression.
Pressure-enthalpy diagram for ethylene: for primary compressors and hypercompressors.
Main limitations: risks of condensation, overheating, decomposition, grease deposits.
Case studies: ethylene compression from 1 to 3000 bar.

PRIMARY COMPRESSORS BEHAVIOR & OPERATION — 1 day

Indicator diagram for ideal and actual cases.

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Influence of process temperatures and pressures.
Dead volume: impact on the intake of the machine.
Capacity control: different methods.
Power, efficiency.
Behavior of multistage reciprocating compressors.
Typical troubleshooting.
Operation: start-up and shutdown difficulties.
Cases studies: industrial ethylene compression, troubleshooting.

HYPERCOMPRESSORS BEHAVIOR & OPERATION — 1 day

Compression ratio limitation due to axial loads on the crankshaft.
Interstage pressure control, risk of rods overbendings or plunger/seals breaks.
Discharge temperature limitation due to decomposition and oligomer deposits.
Lubrication operation and survey: crankshaft, oil seal and cooling. Criticity of the oil type.
Machine safety - PROGNOST™ type monitoring: axial vibrations, rod drop, oil temperatures and pressures, process temperatures and pressures.
Typical defaults, solutions and diagnosis.
Cases studies: various cases of troubleshooting.

TECHNOLOGY OF PRIMARY COMPRESSORS — 0.5 day

Main components: frame, cylinders, piston, piston rings, piston rod, crankhead, crankshaft, distance pieces, valves, rod seals.
Auxiliaries: pulsation dampeners, crankshaft, seals and cylinder lubrication systems, cooling systems, safety devices.
Capacity control technology: main components (unloaders, clearance pockets).
Application: various compressor parts demonstrations.

TECHNOLOGY OF HYPERCOMPRESSORS — 0.5 day

Main differences with classical reciprocating compressors.
Hypercompressor description: valves, cylinders, seals.
Auxiliaries:

- Construction and survey.
- Crankshaft lubrication.
- Rod seal lubrication.
- Oil seal and cooling.
- Drains.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Steam Turbines Operation

EXTAV-EN-P | **Face-to-face only** | **5 days**

This training provides an appropriate knowledge of steam turbine technology, performance and operation

Level

Skilled

Public

Engineers and technicians in charge of steam turbine operation, maintenance and steam turbine projects

Objectives

Attendees will be able to implement the following skills:

- Explain the operating principle and the basics of steam turbine control
- Recognize the technology and different components of single- and multi-stage turbines
- List the main criteria for selecting a steam turbine

Pedagogical & technical resources

Study of industrial cases:

- Different examples of steam turbines design and on-site layout
- Use of a dynamic simulator to demonstrate typical features

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

STEAM TURBINE PERFORMANCE — 1.25 days

Steam properties, inlet and exhaust conditions. Ideal and actual expansion.
Monitoring steam characteristics on the Mollier diagram: expansion, heating, efficiency, etc.
Expansion mechanisms: impulse stage, reaction stage and different types of multistage turbine.
Overall performance. Efficiency, steam consumption related to power supply.
Application: analysis of industrial turbine operation.

TECHNOLOGY — 1.5 days

Main types of turbines, new designs.
Technical components: rotor, wheels, casing, bearings and thrust bearings, sealing devices.
Vibrations and critical speeds. Condenser and vacuum devices.
Application: study of different types of turbines and related auxiliary systems.
Practical workshop: study of component parts using a dismantled turbine.

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STEAM TURBINE CONTROL SYSTEMS — 0.75 day

Speed control systems. Controllers: characteristics of conventional and digital controllers.
Equipment technology: sensors, transmitters, controllers.
Safety devices: overspeed, vibrations, temperature.

OPERATION — 1 day

Lubrication and sealing devices.
Important parameters for turbine operation.
Monitoring of steam circuit and lubrication circuit.
Start-up and shutdown sequences of different types of turbines.
Incidents occurring in the steam network, the machine or the ancillary equipment.
Safety and prevention.

DYNAMIC SIMULATION - APPLICATIONS — 0.5 day

Preparation and start-up of a steam turbine driving a centrifugal compressor.

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Training - Polymers Extrusion and Pelletizing

EXTRU-EN-P | **Face-to-face only** | **3 days**

This course provides a better knowledge of the equipment and physical phenomena used in the extrusion and granulation of polymers, and a better understanding of the operating rules

Level

Skilled

Public

- Operating staff in charge of the operation of extruders; pelletizers and ancillary equipment
- Technical staff involved in the operation or maintenance of this kind of facilities

Objectives

Attendees will be able to implement the following skills:

- Describe the phenomena involved in an extruder
- Explain settings
- Assign the role of safety and automation

Pedagogical & technical resources

- The content may be customized for a particular type of machine or for products if information is provided in advance
- Otherwise, standard products are covered: PolyEthylene, PolyPropylene. It can be implemented on specialties polymers and compounds
- Case studies based on industrial cases

Assessment of achievements

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Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

EXTRUSION OF THERMOPLASTIC - PROCESS DESCRIPTION — 0.25 day

Aim of the extrusion, general layout description and the various steps of the polymer treatment.
Operating principle of raw material feeding system.

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Operating principle and different cross section areas: feeding system, filling, melting, degassing, compression, transport, pelletization.
Different types of screws, advantages and drawbacks.
Different types of extruders: single screw, counter-rotating or co-rotative twin screw, BUSS type mixers, advantages and drawbacks.
Operating principle of pellets conveying.

TECHNOLOGY & OPERATION OF EXTRUDERS 1.5 days

Drive: motors and starters, variable speed drives, gearboxes, loads, overload safety devices, structure of the thrust bearings, auxiliaries..
Extruder: feeding systems, blockage prevention; different section of screw and barrel, adjusting the temperature; starting diverter valve and start-up operation; fouling filters monitoring and filter changing device, the die plate: technology, different heating systems, pressure monitoring, calculating the percentage of blocked holes, risk of damage. The pelletizer, different cutting systems, calculation and adjustment of knifes speed, water flow, water temperature, monitoring of pellets size/shape.
Principle of heat exchange in the die plate and temperature control.

AUTOMATION & SAFETY 0.25 day

Review of the machine safety principles (flow charts, logic diagrams).

PRODUCT QUALITY 0.25 day

Different grades manufactured; specifications in relation to the applications.
Laboratory tests: equipment procedures, visualization of various types of defects.

INFLUENCE OF OPERATING PARAMETERS 0.75 day

Fluidity, viscosity: dynamic viscosity, definition, effect of shear rate, kinematic viscosity, melt index (MI), testing conditions, temperature effect.
Consequences: control of the temperature as a function of the polymer grade and feedrate.
Required power: the influence of the feedrate, the MI and temperature: guidelines.
Equipment reliability.
Application: troubleshooting, solutions, items to be checked.

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Training - M&A in the Energy World

FAE-EN-P | Face-to-face only | 2 days

Current developments in the energy sector are expected to lead to a new wave of mergers and acquisitions (M&A). Traditional Oil & Gas players will have to adapt (or continue to adapt for the most advanced) their business portfolio to the energy transition, and also to meet the challenges of the recent health crisis. The growth of Renewable Energy could also lead to consolidation amongst the first entrants as the sector matures. The objective of this training is to enable participants to successfully manage their acquisition operations and/or asset sales so that they can best position themselves for the future

Level

Knowledge

Public

Oil & Gas, Renewables companies' commercial, technical, financial managers and support functions staff involved in external growth operations. Public administration decision makers and personnel (industry, finance, energy, environment)

Objectives

Attendees will be able to implement the following skills:

- Lead/contribute to an M&A project through a structured process
- Evaluate assets to buy or sell using different methods (e.g.: multiples, discounted cash flows)

Pedagogical & technical resources

- Exercises
- Analysis of recent transactions
- Case studies: setting the maximum purchase price
- Case study: Critical review of a sale and purchase contract clauses
- Quiz

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
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Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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KEY STEPS & RISKS OF M&A TRANSACTIONS — 0.2 day

The various types of transactions: assets/equity.
The main stages of an acquisition/divestment project.
M&A transactions risks: key success factors.
Key participants in the process.

DETERMINING THE PURCHASE/SALE PRICE — 1 day

The different valuation methods: multiples (comparable transactions, EBITDA, PER), discounted cash flows.
Discounted cash flow method and analysis criteria refresher (NPV, IRR, Payback time). Calculating the residual value/terminal value.
Defining the maximum purchase price (or minimum sale price) taking into account synergies/di-synergies and risks.
Price adjustment options to manage uncertainties/close valuation gaps between buyer and seller.
Taking into account debt.

DUE DILIGENCE & DEAL STRUCTURING — 0.4 day

Preparing an information memorandum.
Risk management. The due diligence process and datarooms.
Choosing the legal and tax structure of the transaction.
Assessing the impact of competition laws.

NEGOTIATIONS & KEY CLAUSES OF SALE & PURCHASE AGREEMENTS — 0.4 day

Pros and cons of the various sale methods: auctions, negotiations.
Counterparties' assessment.
Conditions/ precedents.
Commitments and guarantees.
Completion adjustments.

Sessions

Rueil-Malmaison - From 09/08/2026 to 09/09/2026 — **1980 €/HT**

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Downstream Panel Operator

FBMOC-EN-P | **Face-to-face only** | **35 days**

This course makes possible a rapid mastery of panelist skills. The facilities are optimized and operated in a pro-active way Successful participants will be granted the “Panel Operator” IFP Training Certificate

IFP Training Certificate

Vocational Certificate

Level

Knowledge

Public

Experienced field operators moving to panel operator positions in refining and petrochemical plants

Objectives

Attendees will be able to implement the following skills:

- Specify the elements of communication that allow you to work effectively in a team
- Explain the process studied
- Identify risks to equipment
- List unit settings to optimize production and product quality
- Identify possible causes of process disruption
- Specify the points to be taken into account in order to prepare, start and stop a unit

Pedagogical & technical resources

- Case studies and applications on generic dynamic simulators: 80% of the time spent in the training center
- Reminding of necessary theoretical and technical fundamentals directly through simulator handlings
- Training involves on-site work and supervision from mentors in the plant
- Permanent interactive delivery method
- Some pedagogical activities of this course can take place in OLEUM's facilities (subject to availability)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

WELCOME (IF IN OLEUM FACILITIES)

- Welcome/safety. PPE distribution. Presentation of the training.

PANEL OPERATOR DUTIES & CONTROL ROOM ACTIVITIES — 2 days

Panel operator role within the operation team; control room staff. Reporting and handover duties.
Plant documentation: inventory, content, usage, role and duties of the panel operator.

BASIC PROFESSIONAL TRAINING — 2 days

Notions of industrial chemistry. Fluid mechanics: pressure, flowrates, fluid flow, pressure drops.
Heat exchange: exchange mechanisms, resistance to heat transfer.
Liquid-vapor equilibrium of pure substances and mixtures.
Simulators: impact of operating parameters on the chemical reaction performances, heat exchanges through various types of heat exchangers, separation in a flash drum.

PROCESS CONTROL, AUTOMATION & DCS USAGE — 6 days

Process control:

- Constitution of a control loop, symbols used. Sensors and transmitters. Control valves.
- Controllers operating principles, inputs/outputs, internal parameters and tuning.
- Complex control loops (cascade, split range, multiple calculation blocks). Advanced control basics.
- Simulators: Valves characteristic curves. PID parameters tuning. Heat exchanger duty control. Split range configuration. Behavior analysis of complex control loops.

Distributed Control System (DCS):

- Architecture and system components. Man - Machine Interface (MMI). Trends tools. Information flux between site and control room.

Automation:

- Safety instrumented systems: PSS, ESD, HIPPS, EDP; architecture and relationship with DCS. Safety logics and cause & effect matrix.
- PLCs and automation: grafcet analysis, study of specific sequences.
- Simulators: furnace safety logics.

EQUIPMENT OPERATION — 8 days

For each: working principles, technology, ancillary systems, process control scheme monitoring, operation, alarms, safety devices.
Pumps, compressors, drivers:

- Simulators: filters switch, operation of pumps; changes in operating conditions, capacity control of compressors, troubleshooting of a compressor; start-up of a steam turbine driven centrifugal compressor.

Thermal equipment: heat exchangers, air coolers, furnaces, boilers:

- Simulators: fouling of a heat exchanger; changing fuel supplied to burners, coil fouling, start-up and shutdown of a furnace.

Specific equipment for a given assignment unit (gas turbines, solid handling, extruders...).

PRODUCTS & PROCESSES — 8 days

Composition and physico-chemical properties of feeds and products.
Commercial product quality requirements, specification and standard tests. Mixing rules.
Process units: role, principles, main equipment, specific hazards. Influence of the main operating parameters on the operation, consequences on process and products. Material balance.

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Distillation, absorption, stripping.
Utilities: flare systems, air production, effluent treatment units, steam, water treatments...:

- Simulators: start-up and shutdown, operation and control of various process units (for instance: two-product distillation columns, multi draw-off distillation column, amine absorption and regeneration, sulfur recovery unit, hydrotreatment unit).

INTEGRATED PLANT SAFE OPERATION — 6 days

Panel operator safe behavior:

- Radio communication, other communication equipment. Teamwork, responsibility sharing. Transmission of know-how.
- Alertness, forward thinking plant operation. Alarm management.
- Application: role plays using the simulators (with panel operator views and FODs).

HSE in operation:

- Product, equipment and process-related risks; prevention and protection.
- Risks related to operation of equipment, to decommissioning-commissioning and start-up of equipment, specific prevention measures.
- Routine operations. Permit to work, work order, consignations and isolations.
- Special operations: SIMOPS, black start. Emergency operation and crisis management.
- Impact of plant operation on gas release into the atmosphere and on the wastewater treatment unit; minimization of releases.

Integrated plant operation:

- Steady state runs: routine checks, operating windows, integrated plant behavior (inertia, interferences).
- Global performances, margin optimization/impact of quality gaps.
- Identification, analysis and reaction to upsets and equipment failures; stabilization.

Simulators: field round on a running process unit; commissioning, start-up and shutdown procedures, justifications of different steps; inhibition management; operations in downgraded situations; practice of emergency operations.

ASSESSMENT — 3 days

Continuous assessment (including practical exercises on simulators).
Final test with real-life situation simulation exercises to validate objectives.

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Training - Field Operations Engineer

FIELDIG-EN-P | Face-to-face only | 60 days

This course aims to provide the in-depth technical knowledge of Oil & Gas production facilities design and operation necessary to hold rapidly, and very effectively, the position of field operations engineer or project engineer

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers (particularly recently graduated field, design or project engineers) interested in a specialization in Oil & Gas surface production operations

Objectives

Attendees will be able to implement the following skills:

- Grasp fundamentals of reservoir engineering, drilling, well completion and servicing
- Evaluate well performance and identify needs for artificial lift
- Explain fundamental concepts underlying Oil & Gas processing
- Analyze operating conditions and basic design of oil, water and gas treatment
- Describe the technology of static equipment and rotating machinery used in production facilities
- Identify offshore development techniques and flow assurance issues
- Identify main risks related to O&G production operations and contribute to process safety management
- Contribute to the dynamics of field development projects studies

Pedagogical & technical resources

- Highly interactive training with industry specialist lecturers
- Numerous applications and illustrations
- Multiple teamwork sessions. Use of dynamic simulations and industrial case studies
- Numerous simulations performed using the PRO/II™ or HYSYS™ software
- Several tutorials with equipment in a workshop. Site/field visits

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

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Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS OF GEOSCIENCES & RESERVOIR ENGINEERING — 5 days

Petroleum geology and geophysics. Reservoir fluids. Petrophysics.
Well log interpretation. Well testing. Reservoir engineering and simulation.

FUNDAMENTALS OF DRILLING, WELL COMPLETION & WELL PERFORMANCE — 5 days

Fundamentals of drilling. Well completion, well servicing and workover. Well performance and artificial lift.

ADVANCED OIL & GAS FIELD PROCESSING — 15 days

Module I: Thermodynamics applied to well effluent processing

- Well effluent. Ideal gas and real fluid behavior.
- Gas compression and expansion.
- Liquid-vapor equilibrium of pure components and mixtures. Mixture separation.
- Heat transfer, heat balance and thermal equipment.

Module II: Oil & water treatment

- Crude oil treatment: stabilization, dehydration, sweetening.
- Storage equipment.
- Reject and injection water treatment.

Module III: Gas processing & conditioning

- Gas processing: dehydration, sweetening, NGL recovery.
- Fundamentals of Liquefied Natural Gas (LNG) chain.

PIPING & INSTRUMENTED SYSTEMS — 5 days

Gathering networks design. Piping. Valves. Schematization of Oil & Gas production facilities. Metallurgy. Corrosion. Cathodic protection. Instrumentation & Process Control. Safety Instrumented Systems. Metering systems.

ROTATING MACHINERY - TECHNOLOGY, SELECTION & OPERATION (IN MECHANICAL WORKSHOP) — 5 days

Centrifugal and positive displacement pumps. Centrifugal and reciprocating compressors.
Gas turbines. Turbo-expanders.

OFFSHORE FIELD DEVELOPMENT - PIPELINES & FLOW ASSURANCE — 5 days

Context of offshore developments. Fixed and floating production structures. Construction and installation of platforms.
Pipelines: technology, laying and operation. Deep offshore developments. FSO & FPSO technology. Flow assurance & multi-phase flow.

PRODUCTION ACCOUNTING & MATERIAL BALANCE — 3 days

Measures and metering systems along the chain. Liquid and gas balances. Performance monitoring and production reporting.
Case study and production balances reconstruction: back allocation, satellite fields...

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PETROLEUM ECONOMICS & PROJECT MANAGEMENT — 2 days

Project management. Project cost estimation and cost control. Fundamentals of contracts. Project profitability evaluation. Risk analysis of Exploration & Production projects.

PROCESS SAFETY MANAGEMENT — 5 days

Process hazard analysis: HAZID, HAZOP. Operating procedures. Mechanical integrity. Organizational elements. Continuous improvement elements.

FIELD DEVELOPMENT PROJECT - JURY — 10 days

During this final project, participants will select field development scenario and architecture, design wells, evaluate well performances, design and simulate process, realize heat and mass balance and evaluate profitability of their project.
This 10-day teamwork project is a real case study based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury):

- Field architecture. Well design and completion. Process design and simulation. Main equipment sizing. Heat and mass balance. Fuel gas requirements. HAZID and plant layout.

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Training - Flare Network Design Engineering

FLARE-EN-P | Face-to-face only | 5 days

This course aims to acquire a detailed understanding of relief systems and flare network, as well as the technology of main equipment involved and monitoring basics

Level

Knowledge

Public

Managers, engineers and technicians looking for technical information and understanding of flare network in Oil & Gas production facilities

Objectives

Attendees will be able to implement the following skills:

- Provide technical knowledge and practical approach of relief system and flare network in Oil & Gas processing facilities, as well as the technology and operating principle of the equipment used in these facilities
- Review the basics of Oil & Gas field protection against overpressure
- Detail the available process technologies allowing to respect reject regulations
- Select and size the key components of those networks
- Describe the technology of the main equipment used

Pedagogical & technical resources

- Numerous application exercises inspired from actual Oil & Gas production facilities
- Design practice on Aspen Flare System simulator

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OVERVIEW OF TYPICAL RELIEF & FLARE SYSTEMS — 0.5 day

Codes and standards typical in Oil & Gas facilities.
Safety implications and causes of overpressure.

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Overpressure source:

- Protection philosophy.
- Source isolation.
- Relief.

Environmental regulation and standards.

MECHANICAL SPECIFICATION OF PRESSURE VESSELS & HEAT EXCHANGERS — 0.75 day

Vessels codes and standards.
Material selection.
Metallurgy, heat effect and corrosion mechanism.
Design calculation for pressure vessels and heat exchangers.
Vessel integrity, evaluation according to the Oil & Gas standards.

RELIEF GAS SYSTEM OVERVIEW — 0.75 day

System equipment and components.
Relief gas parameters and process safety management.
Monitoring systems and procedures.
Blow down:

- Purpose.
- Operational consideration.
- Design and specification.

FLARE SYSTEM — 1.5 days

Flare gas recovery, smokeless flaring and purge gas conservation.
Defining need and quantity of purge gas.
Selection and design of key components:

- KO drum, vent and flare stack, vent and flare tips.
- Flare ignition systems.

Thermal oxidizers:

- Principle of operation.
- Components and equipment.

Radiation calculation.

CASE STUDY: FLARE SYSTEM SIZING — 1.5 days

Study of an existing plant.
Introduction to Aspen Flare System.
Design of the relief gas system and the corresponding flare network using Aspen Flare System.

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This training course is offered under the **Alliance4Training** brand

Training - The Essentials for Field Operators

FTBO-EN-P | **Face-to-face only** | **40 days**

This course provides operators with the knowledge and know-how required for safe, efficient and reliable field operations

Level

Knowledge

Public

- Operators of oil refineries or chemical plants, without any operator certification background
- Technicians or staff to be retrained as operators in the chemical, petrochemical or oil industries

Objectives

Attendees will be able to implement the following skills:

- Specify the elements of communication that allow you to work effectively in a team
- List the monitoring points of a unit
- List the types of operations of a unit
- Identify risks to equipment
- List unit settings to optimize production and product quality
- Identify possible causes of process disruption
- Specify the points to be taken into account in order to prepare, start up and shut down a unit

Pedagogical & technical resources

- IFP Training classroom training uses interactive delivery methods (tutorials, case studies, role playing)
- During classroom training, short practical on-site exercises on specific pieces of equipment
- In between IFP Training classroom modules, On-the-Job Orientation on Clients' assigned unit

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

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PIPING - VESSELS - STORAGE TANKS - DRAWINGS — 6 days

Valves, fittings, flexible hoses, safety devices/interlocks. Vessels, storage tanks. Identification symbols for various items of equipment.
Block diagrams, flow sheet, P&ID. Introduction to isometric drawings.

- Field applications: equipment recognition, practical exercise of line-plotting, demonstration equipment in the workshop (when available).

INSTRUMENTATION & CONTROL DEVICES — 7 days

Physical variables used in process operations (pressure, temperature, flowrate, density, specific gravity).
Components of a control loop. Instrumentation: workings and operation.

- Field applications: practical exercise on control loops, demonstration loops (if available), work on Man-Machine Interface in control room.

HEAT EXCHANGE EQUIPMENT — 7 days

Heat, energy and heat transfer. Heat exchangers: technology, main types, workings and operation.

- On-site practical exercise on a heat exchanger.

Furnaces and boilers: technology, combustion, draft and operation.

- On-site practical exercise on furnaces/boilers.

ROTATING MACHINERY — 8 days

Fluid flows.

- Rotating machinery field recognition.

Centrifugal and positive displacement pumps.

- On-site practical exercise on pumps.

Centrifugal and reciprocating compressors.
Single stage, back-pressure steam turbines.

- On-site practical exercise on a compressor or turbine.

Electric motors operation.
Extruder.

PROCESSES - PRODUCTS - SAMPLING & TESTING - UTILITIES — 5 days

Basic chemistry. Chemical products and chemical solutions: composition and hazards.
Chemical reactions.
Vapor pressure and boiling point.
Distillation: principles of the separation, distillation columns.
Products. Quality control tests. Sampling.
Principles of manufacturing processes.
Notion of material and heat balance.
Manufacturing process diagram.
Utilities: flare network, wastewater treatment, cooling water, air production.

- On-site practical exercise on different processes (main equipment, operating conditions).

OPERATORS' TOOLS - SKILLS & ORGANIZATION — 2 days

Plant documentation: inventory, content, usage.
Radio communication. Teamwork.
Reporting and handover duties.

- Role plays.

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SAFETY — 5 days

Product hazards: flammability, toxicity, physical hazards.

- Job Safety Analysis for field operators' routine activity (equipment check, circuit alignment, sampling, etc.).

Emptying processes: blind and gasket fitting, degassing and inerting, entering a vessel.
Example of procedures for equipment shutdown and start-up.
Safe behavior.

- Field hazard recognition and prevention means plotting.
- Case studies - Group work. Lessons learned.

ASSESSMENT (DURATION INCLUDED IN THE PREVIOUS CHAPTERS)

Continuous assessment: written tests and oral presentations.

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Training - Furnaces: Safe Operation and Optimization

FURNSOO-EN-P | **Face-to-face only** | **4 days**

This course provides in-depth knowledge of furnace operation in the petroleum and petrochemical industries. The course covers also the safety and reliability constraints

Level

Skilled

Public

- Operators, panel operators, supervisors and plant managers of refining, chemical and petrochemical plants, involved in furnace operation
- Engineers and supervisors concerned with safety, optimization and operating issues of furnaces

Objectives

Attendees will be able to implement the following skills:

- Describe the phenomena involved in industrial combustion and establish the conditions necessary for efficient combustion
- Identify the optimization parameters of a furnace and explain the operation of the main control loops
- List the main phases of a start-up procedure

Pedagogical & technical resources

- Use of a dynamic simulator to understand the impact of operating conditions on thermal performance and furnace operation
- Use of case studies and exercises based on industrial situations
- Special emphasis on safety issues and abnormal situations that can lead to accidents
- The course content can be tailored to different types of furnaces and includes specificities linked to some processing units such as the steam reformer or steamcracker

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

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Responsable

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Program

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FURNACE CONSTRUCTION & OPERATING CONDITIONS — 0.75 day

Different types of furnace and operating conditions. Scope and limitations for improving furnace efficiency.
Construction of heat exchange areas and refractory materials: tube bundle arrangement, insulation, type of material used and operating limits.

COMBUSTION - BURNERS - DRAFT — 1.25 days

Combustion conditions: liquid and fuel gas characteristics, liquid spray.
Burners: fuel and air supply and mixture. Conventional and low NOx burners operation.
Combustion quality: analysis of the oxygen and the unburned material in the flue gases, control of combustion air flowrate and air/fuel ratio.
Combustion safety: flame detection, control and safety devices.
Air and flue gas circulation: natural draft, forced draft, pressure differential control, automatic safety devices.
Damper or induced draft fan role.
Application:

- Natural and forced draft pressure profile drawing. Review of draft constraints.
- Different types of burners and spraying systems.

HEAT TRANSFER & FURNACE OPERATION — 2 days

Heat transfer to the tube coil: control parameters. Impact of internal or external fouling.
Heat control: process fluid outlet temperature, fuel flowrate control.
Most important furnace temperature and constraints: skin temperature, bridgewall temperature, limits and risk of overcoming.
Application: furnace temperature profile and heat recovery distribution as a function of fuel burned and combustion air excess.
On-stream furnace operations: monitoring of combustion and heating. Modifying operating conditions. Analysis of disturbances. Key points for safe operation.
Start-up and shutdown: preparation, safe ignition procedures, ignition after a short shutdown, normal shutdown, emergency shutdown.
Incidents.
Troubleshooting. Prevention.
Application:

- Case study of furnace accidents.
- Start-up procedure study.

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Training - Distillation Process - E-Learning

GCA2-EN-E | E-Learning | 1 hour

This e-learning module provides a brief introduction to distillation process These modules are integrated into some of our Blended Learning courses but can also be followed independently For any information please contact us at the following address: contact@ifptraining.com

Level

Skilled

Public

Professionals, in the oil or petrochemical industry, interested in refining, olefins, aromatics, polymers production. Specifically for engineers and technical staff who are beginners in this industry, as well as subcontractors, traders, etc

Objectives

Attendees will be able to implement the following skills:

- Describe the role of the main equipment of a column to be distilled with regard to the principles implemented

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

FLASH OF A HYDROCARBON MIXTURE

Pure substance vapor pressure curve. Flash separation.

PRINCIPLES OF CONTINUOUS DISTILLATION

Separation enhancement via a distillation column. External reflux and reboiler duty impacts on separation quality and energy consumption.

INDUSTRIAL FEATURES OF THE DISTILLATION PROCESS

Liquid-vapor contact material: packings and trays.
Distillation column main operating conditions.

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Training - Introduction to Catalysts - E-Learning

GCA3-EN-E | **E-Learning** | **1 hour**

This e-learning module provides a brief introduction to refining & petrochemicals catalysts These modules are integrated into some of our Blended Learning courses but can also be followed independently For any information please contact us at the following address: contact@ifptraining.com

Level

Skilled

Public

Professionals, in the oil or petrochemical industry, interested in refining, olefins, aromatics, polymers production. Specifically for engineers and technical staff who are beginners in this industry, as well as subcontractors, traders, etc

Objectives

Attendees will be able to implement the following skills:

- list the main roles of a catalyst and possible contaminants

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

CATALYTIC ACTION

Chemical reactions: reactants, products, activation energy, overall energy balance, effects of the use of a catalyst.
Five elementary steps a catalytic reaction.

INDUSTRIAL APPLICATIONS

Types of catalysis (homogeneous, heterogeneous) and supported catalysts.
Catalyst main properties (activity, selectivity, deactivation or stability, regenerability, reproductibility).
Catalyst contaminants.

CATALYTIC REACTORS EXAMPLES

Radial reactor with a fixed catalytic bed. Axial fixed bed reactor. Dense and sock loading.

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Training - Polymers - E-Learning

GCA4-EN-E | **E-Learning** | **1 hour**

This e-learning module provides a brief introduction to main properties of polymers with a special focus on the most relevant ones in the market: polyethylene and polypropylene These modules are integrated into some of our Blended Learning courses but can also be followed independently For any information please contact us at the following address: contact@ifptraining.com

Level

Skilled

Public

Professionals, in the oil or petrochemical industry, interested in olefins, aromatics, polymers production. Specifically for engineers and technical staff who are beginners in this industry, as well as subcontractors, traders, etc

Objectives

Attendees will be able to implement the following skills:

- Explain the principle of a polymerization reaction

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

INTRODUCTION TO POLYMERS

Monomers: the building blocks. Monomers to Polymer transition.
Synthetic polymers types and main features.

POLYETHYLENE

Polyethylene development timeline. LDPE, LLDPE and HDPE main features and applications.
Brief introduction to Polyethylene processes.

POLYPROPYLENE

Polypropylene atatic, isotatic and syndiotactic forms. Polypropylene main features and applications.
Brief introduction to Polypropylene processes.

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Training - Downstream Oil Value Chain Management

GCAV-EN-P | Face-to-face only | 60 days

This training is part of a professional carrier development to managerial positions in dowstream business, requiring specific skills in refining economics, linear programming, oil trading, logistics and finance, and auditing downstream activities

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Executives from the downstream sector who require a global picture of all the technical, economic, financial, contractual & audits of downstream business activities

Objectives

Attendees will be able to implement the following skills:

- Explain the roles of the various refining units, their interdependence and the operating conditions of the main units
- Identify the economic issues and the main parameters influencing refinery profitability
- Design and use refinery management and optimization tools to increase productivity
- Identify the interactions between the petrochemical sector and other oil sectors
- Appreciate the various risks associated with trading petroleum products
- Analyzing the economic aspects of a logistics chain
- Analyze a company's accounting publications
- Analyze economic results and carry out sensitivity studies

Pedagogical & technical resources

- Case studies simulated on computers
- Analyze the main corporate financial statements issued by Oil & Gas companies
- Cost estimation of downstream projects

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the

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specific needs of learners from the professional world

Program

PART I: BACKGROUND AND FUNDAMENTALS OF THE OIL CHAIN (10 DAYS)

MODULE 1: INTRODUCTION TO EXPLORATION-PRODUCTION — 5 days

Reservoir engineering. Well intervention. Surface facilities.

MODULE 2.A: OVERVIEW OF OIL & GAS CHAIN — 3 days

International energy scene. Upstream economics. Oil trading. Downstream economics.

MODULE 2.B: CASE STUDIES — 2 days

Based on a set of up-to-date documents (reports, articles, contracts) related to refining business, participants work in sub-groups to prepare a presentation.

PART II: TECHNICAL AND ECONOMIC FRAMEWORK OF DOWNSTREAM ACTIVITIES (20 DAYS)

MODULE 3: FUNDAMENTALS OF REFINING & PETROCHEMICALS — 5 days

Refining processing. Petroleum product quality. Refining schemes.

MODULE 4: ECONOMIC FRAMEWORK OF DOWNSTREAM ACTIVIVES — 4 days

Global refining markets. Refining margins. Downstream economics.

MODULE 5: LINEAR PROGRAMMING — 3 days

Optimization. Excel Solver. Linear programming models.

MODULE 6: PETROCHEMICAL ECONOMICS — 3 days

Petrochemical process. Petrochemical markets & economics.

MODULE 7: OIL STORAGE FACILITIES — 5 days

Petroleum products. Atmospheric storage. Control & risk management.

PART III: DOWNSTREAM OIL TRADING & CONTRACTUAL FRAMEWORK (15 DAYS)

MODULE 8: OIL PRICES TRANSMISSION MECHANISMS — 5 days

Main factors influencing the price of crude oil and petroleum products. Macroeconomic factors on crude and product prices.

MODULE 9: TRADING OF CRUDE OIL & PETROLEUM PRODUCTS — 5 days

Differentiation of crude oil - Price setting. Finished oil products. Trading and price setting. Trading of oil products contracts.

MODULE 10: DOWNSTREAM LOGISTICS — 5 days

Technical aspects of logistics. Economic aspects of a logistics chain.

PART IV: ECONOMIC ANALYSIS OF DOWNSTREAM OIL PROJECTS (15 DAYS)

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MODULE 11: DOWNSTREAM ACCOUNTING & FINANCIAL MANAGEMENT — 5 days

Accounting standards. Consolidated financial statements. Reporting (board). Financial analysis.

MODULE 12: DOWNSTREAM AUDITING — 5 days

Introduction to audit and financial reporting. Implementing a contractual auditing.

MODULE 13: PROFITABILITY ANALYSIS OF DOWNSTREAM PROJECTS — 5 days

Economic criteria. Economic costs analysis. Equity profitability analysis and project funding. Risk analysis of downstream projects.

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Training - Gas chain economics and energy transition

GCEG-EN-P | Face-to-face only | 55 days

The natural gas market, including LNG (liquefied natural gas) in particular, has experienced strong development. This sector is impacted by the energy transition and the development of competing energies The IFP Training Certificate program in gas chain economics in this context of the energy transition provides knowledge and know-how to professionals in key disciplines solicited in upstream to downstream gas marketing development projects. It offers professionals the opportunity to acquire high-level skills in the fields of gas project economics as well as an in-depth understanding of the industrial dynamics observed in this natural gas sector

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

All key players, engineers, market analysts, project managers, managers, professionally evolving towards a position requiring in-depth knowledge of the economic and contractual issues of the Gas & LNG chain in this context of energy transition.

Objectives

Attendees will be able to implement the following skills:

- Be aware of the components of the global gas scene
- Specify the characteristics of natural gas and detail the natural gas chain
- Be aware of the technical, operational and commercial conditions concerning shipping
- Make investment profitability analysis in the gas sector
- Identify the main clauses of gas and LNG agreements
- Understand the operational responsibilities of the actors from the chain Front-to-Back

Pedagogical & technical resources

- Highly interactive training with industry expert speakers
- Computer-simulated case studies based on gas projects
- Quizzes, videos and application exercises
- Scenario, negotiation role plays

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

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Program

MODULE 1: ENERGY ISSUES AND IMPACT ON THE GAS MARKET IN THE 21ST CENTURY — 3 days

Climate commitments.
Energy needs and climate change.
Energy transition and geopolitics.
Oil and gas vs electricity.
Oil and gas company strategies.

MODULE 2: SAVING THE GAS CHAIN AND LNG — 4 days

Natural gas in the global energy balance and the strategies of the main players in the industry.
Natural gas opportunities and emerging trends in the gas and LNG industry.
Main technical, economic and contractual characteristics of the natural gas value chain, from the production well to the final consumer.
Gas and LNG markets and their evolution (price, hedging, etc.).

MODULE 3: NATURAL GAS: TYPES, SPECIFICATIONS & PROCESSING TECHNOLOGIES — 5 days

Fundamentals of natural gas composition, characteristics, production and field processing.
Technical issues and specific constraints of natural gas transport and storage.
Review of the different end-user markets available for natural gas upgrading.
Main economic issues of the natural gas chain.

MODULE 4: LNG: RISKS, TECHNOLOGIES, AND OPERATIONS — 5 days

The LNG chain: liquefaction, transport, storage, regasification.
Specific properties of LNG - cryogenics.
Liquefaction and revaporization processes.
Vessel specifications, operation and operations.
Regasification terminals: storage, loading/unloading, regasification.
Operation of LNG facilities.

MODULE 5: ECONOMICS AND MANAGEMENT OF UPSTREAM GAS — 4 days

Key issues and constraints in contract negotiations (government, national and international companies).
Overview and analysis of the different tax systems and contractual frameworks that exist.
Main contractual and tax clauses of E&P contracts.

MODULE 6: CONTRACTUAL FRAMEWORK FOR THE MARKETING OF GAS AND LNG — 4 days

Main articles of long-term agreements on natural gas and LNG.
Key points of the commercial clauses.
Natural gas pricing and transportation principles.
Techniques for negotiating master sales and purchase contracts.

MODULE 7: PROFITABILITY STUDIES OF INVESTMENTS IN THE GAS INDUSTRY — 5 days

Development of advanced computer models for the economic evaluation of gas projects.

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Incorporation of a specific financing plan through the analysis of the return on equity.
Analysis of economic results and conducting sensitivity analyses.
Taking into account risk and uncertainty in the economic evaluation of gas projects.
Government Policies and Support Programs / Investment Incentives and Barriers.

MODULE 8: UNDERGROUND CARBON CAPTURE AND STORAGE (CCUS) AND ITS ECONOMIC IMPACT ON THE GAS CHAIN — 5 days

CCUS technologies: Where do we stand? Synergies with natural gas?
Integration of a CCUS project upstream of a gas project and development cost.
CCUS price vs carbon credit.
Profitability and financing of carbon capture and storage.
Economic impact of CCUS and carbon credits on the profitability of gas projects.

MODULE 9: INVESTMENT AND PROJECT MANAGEMENT THROUGHOUT OF THE GAS CHAIN — 5 days

Preliminary studies, conceptual studies, EPC phase and project implementation plan.
Local content and sustainable development.
Phases of a gas project. Detailed engineering of an LNG project and associated activities.
Technical contracts. Project organization, governance, interface and communication management.
HSE management, quality and risks. Project management: costs and planning.
Case studies.

MODULE 10: DOWNSTREAM GAS MARKET IN EMERGING COUNTRIES AND CONVERGENCE GAS & ELECTRICITY — 5 days

Modern natural gas markets: segmentation and regulation in emerging countries.
Operation of the downstream natural gas market.
Natural gas trading: physical market and financial market.
The role of LNG in the globalization of transactions.
Gas / Electricity: competition and convergence.

MODULE 11: FOCUS ON NATURAL GAS AND ENERGY TRANSITION — 5 days

Future of fossil fuels: Another important role for natural gas.
Natural gas value chain and carbon neutrality.
Sustainable development for gas and LNG.
Gas and LNG saving vs carbon storage.
Natural gas resource for electricity generation.

FINAL PROJECT — 5 days

End-of-study project on a theme specific to the economics of energy transition.

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Training - Petroleum Studies in Maintenance

GDMAINT-EN-P | Face-to-face only | 60 days

The set of public courses hereunder leads to an IFP Training graduate certificate diploma of petroleum studies in Maintenance

IFP Training Certificate

Graduate Certificate

Level

Expert

Public

Maintenance Engineer, newly recruited or Maintenance Technician moving into management positions related to maintenance activities in the Oil & gas industry

Objectives

Attendees will be able to implement the following skills:

- Explain the role of various processing units in a refinery and describe the main manufacturing schemes encountered in oil refining.
- Read and understand a P&ID, identify the technology used for field instrumentation.
- Describe thermal equipment and explain impact of operating conditions on heaters' performance.
- Explain the operation and operation of centrifugal pumps and technical solutions.
- Explain the operation of centrifugal and axial compressors, steam turbines and expanders.
- List the essential elements for the sizing and choice of a compressor or turbine.
- Know the proven maintenance policies (TPM, RCM, RBM, key performance indicators, preventive maintenance tools...) in order to be able to set goals in terms of company global efficiency.
- Recognize the different forms of deterioration affecting industrial equipment.
- Specify the elements to be considered to prevent corrosion.
- List the design and optimization criteria of a utility production scheme (steam, electricity, water, air) with regard to environmental constraints.
- List the various aspects of project engineering to be applied in real cases.
- Identify risks related to products used on a facility and the recommended preventive measures in view of the importance of the risk.
- Present pre-commissioning, commissioning and start-up activities on a project from the perspective of their programming and management.
- Specify organizational and supervisory elements that make shutdown work effective.

Pedagogical & technical resources

- Detailed course material with a glossary of the main technical terms used in the refining industry.
- Active participation of trainees through interactive games and quizzes to grasp the key points of the course.
- Illustration of process control using dynamic simulators (IndissPlus de CORYS).
- Actual examples and applications from the refining, petrochemical and chemical industry.
- Use of a dynamic simulator (centrifugal compressor + steam turbine).

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- Short scenarios of the most frequent and the most serious key equipment failures, proposed by the trainer and analyzed by the group. Participants shall use their technical knowledge, reasoning skills, multidisciplinarity and operational capacities
- Wide use of samples, videos and pictures to develop practical case studies for pressure equipment such as piping, heat exchanger, reactor, distillation column, boiler, etc.
- Project by team (2 or 3 students): conception of a PID scheme from a PFD.
- Case studies and analysis of incidents and accidents.
- Cases studies on the precommissioning, commissioning and start-up of typical units.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

REFINING PROCESSES & PETROLEUM PRODUCTS	**5 days**
INSTRUMENTATION & PROCESS CONTROL CERTIFICATION	**5 days**
THERMAL EQUIPMENT	**5 days**
CENTRIFUGAL PUMPS & POSITIVE DISPLACEMENT PUMPS	**5 days**
KEY POINTS FOR COMPRESSORS & TURBINES OPERATION & INSPECTION	**5 days**
MAINTENANCE MANAGEMENT & EQUIPMENT AVAILABILITY	**5 days**
DEGRADATION CORROSION & CORROSION PREVENTION	**5 days**
UTILITIES - ENVIRONMENT MANAGEMENT	**5 days**
PIPING & INSTRUMENTATION DIAGRAM - PID (PROJECT)	**5 days**
SAFETY IN PLANT OPERATION	**5 days**
COMMISSIONING & START-UP OF PROCESS UNITS	**5 days**

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TURNAROUND MANAGEMENT

5 days

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Training - Petroleum Studies Refining and Petrochemicals

GDPETRC-EN-P | Face-to-face only | 60 days

The set of public courses hereunder leads to an IFP Training graduate Certificate of petroleum studies in Refining and Petochemicals

IFP Training Certificate

Graduate Certificate

Level

Expert

Public

Process Engineers newly recruited or technicians with high potential and involved in design, operation and optimization of equipment and processes in the refining and petrochemical industry

Objectives

Attendees will be able to implement the following skills:

- Explain the role of various processing units in a refinery and petrochemical complex and describe the main manufacturing schemes encountered.
- Read and understand a P&ID, identify the technology used for field instrumentation.
- Describe thermal equipment and explain impact of operating conditions on heaters' performance.
- Explain the operation and operation of centrifugal pumps and technical solutions.
- Explain the operation of centrifugal and axial compressors, steam turbines and expanders.
- List the essential elements for the sizing and choice of a compressor or turbine.
- List the design and optimization criteria of a utility production scheme (steam, electricity, water, air) with regard to environmental constraints.
- List the various aspects of project engineering to be applied in real cases.
- Identify risks related to products used on a facility and the recommended preventive measures in view of the importance of the risk.
- Present pre-commissioning, commissioning and start-up activities on a project from the perspective of their programming and management.

Pedagogical & technical resources

- Detailed course material with a glossary of the main technical terms used in the refining & petrochemical industry.
- Active participation of trainees through interactive games and quizzes to grasp the key points of the course.
- Illustration of process control using dynamic simulators (IndissPlus de CORYS).
- Actual examples and applications from the refining, petrochemical and chemical industry.
- Use of a dynamic simulator (centrifugal compressor + steam turbine).
- Short scenarios of the most frequent and the most serious key equipment failures, proposed by the trainer and analyzed by the group. Participants shall use their technical knowledge, reasoning skills, multidisciplinarity and operational capacities.
- Project by team (2 or 3 students): conception of a PID scheme from a PFD.

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- Case studies and analysis of incidents and accidents.
- Cases studies on the precommissioning, commissioning and start-up of typical units.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

APPLIED THERMODYNAMICS	5 days
INSTRUMENTATION & PROCESS CONTROL CERTIFICATION	5 days
THERMAL EQUIPMENT	5 days
CENTRIFUGAL PUMPS & POSITIVE DISPLACEMENT PUMPS	5 days
KEY POINTS FOR COMPRESSORS & TURBINES OPERATION & INSPECTION	5 days
LIGHT CUTS PROCESSING	5 days
HEAVY CUTS PROCESSING	5 days
UTILITIES - ENVIRONMENT MANAGEMENT	5 days
PIPING & INSTRUMENTATION DIAGRAM - PID (PROJECT)	5 days
SAFETY IN PLANT OPERATION	5 days
COMMISSIONING & START-UP OF PROCESS UNITS	5 days
PRODUCTION OF BASE CHEMICALS & COMMODITY POLYMERS	5 days

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Training - Applied Chemical Engineering to Oil, Gas and Chemical Fields - Module 1

GENCHI1-EN-P | Face-to-face only | 3 days

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

Level

Expert

Public

- Engineers and technicians whose activities are related to the operation of industrial sites: production, maintenance, plant projects, process control, laboratory, engineering, R&D, etc
- Every type of activities is concerned: refining, petrochemistry, heavy chemistry, engineering

Objectives

Attendees will be able to implement the following skills:

- Specify the principles of chemical engineering governing the operation of equipment

Pedagogical & technical resources

- 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

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MODULE 1: LIQUID-VAPOR EQUILIBRIA, DISTILLATION & PRELIMINARY DESIGN — 3 days

Thermodynamics in liquid-vapor equilibria:

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- 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 (GENCHI2-EN-P) 3 days

MODULE 3: HEAT & ENERGY TRANSFER (GENCHI3-EN-P) 4 days

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Training - Applied Chemical Engineering to Oil, Gas and Chemical Fields - Module 2

GENCHI2-EN-P | Face-to-face only | 3 days

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

Level

Expert

Public

- Engineers and technicians whose activities are related to the operation of industrial sites: production, maintenance, plant projects, process control, laboratory, engineering, R&D, etc
- Every type of activities is concerned: refining, petrochemistry, heavy chemistry, engineering

Objectives

Attendees will be able to implement the following skills:

- Specify the principles of chemical engineering governing the operation of equipment

Pedagogical & technical resources

- 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

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MODULE 1: LIQUID-VAPOR EQUILIBRIA, DISTILLATION & PRELIMINARY DESIGN (GENCHI1-EN-P) — **3 days**

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MODULE 2: FLUID FLOW & ROTATING EQUIPMENT — 3 days

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 (GENCHI3-EN-P) — 4 days

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Training - Applied Chemical Engineering to Oil, Gas and Chemical Fields - Module 3

GENCHI3-EN-P | Face-to-face only | 4 days

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

Level

Expert

Public

- Engineers and technicians whose activities are related to the operation of industrial sites: production, maintenance, plant projects, process control, laboratory, engineering, R&D, etc
- Every type of activities is concerned: refining, petrochemistry, heavy chemistry, engineering

Objectives

Attendees will be able to implement the following skills:

- Specify the principles of chemical engineering governing the operation of equipment

Pedagogical & technical resources

- 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

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MODULE 1: LIQUID-VAPOR EQUILIBRIA, DISTILLATION & PRELIMINARY DESIGN (GENCHI1-EN-P) — **3 days**

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MODULE 2: FLUID FLOW & ROTATING EQUIPMENT (GENCHI2-EN-P) 3 days

MODULE 3: HEAT & ENERGY TRANSFER 4 days

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.

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Training - Fundamentals of Mechanical Maintenance

GENMAIN-EN-P | **Face-to-face only** | **5 days**

This course aims to master the elements of language and understanding of mechanical systems, in terms of design, characterization, maintenance and repair. This will contribute to the maintenance follow-up, but also to the optimized operation of the static and dynamic mechanical systems (rotating machinery)

Level

Knowledge

Public

All technicians from the Oil & Gas industry who work in connection with equipment and mechanical systems (operation, maintenance) and who do not know the fundamentals of design of these systems (or who wish to deepen their knowledge). Jobs mainly concerned: mechanicals, mechanical assistants, mechanical supervisors

Objectives

Attendees will be able to implement the following skills:

- Know the basics of technical drawing, characterize a part, a mechanical assembly
- Identify the different mechanical construction materials
- Know the fundamentals of mechanical system design, the main assemblies (bearing assemblies)
- Know the main power transmission elements (gears, joints...), wisely use the metrology devices used in workshop
- Describe the mechanical strength, chemical resistance and thermal resistance

Pedagogical & technical resources

- Very interactive training given by highly experienced trainers
- Gradual mechanical approach, from the dimensioning of a simple mechanical part to the design basis of a dynamic system such as a rotating machine

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNICAL REPRESENTATION OF PARTS & SIMPLE MECHANICAL SYSTEMS — 2 days

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Technical drawing agreement: 2D and isometric views, projections, section and cut-away views, perspectives, technical vocabulary.
Dimensioning of parts and mechanical systems, ISO tolerancies and main adjustments.
Dimensional tolerancies and clearance.
Geometric tolerancies and surface condition characterization.
Presentation of the tools in a metrology shop, performances and rules of use.
Practical exercises:

- Dimensioning and full geometric control of a pump shaft.
- Understanding of a simple machine cut-away view.
- Representation of a machine element in 2D projection and perspectives.

ELEMENTS OF CONSTRUCTION — 1 day

Materials used in the Oil & Gas industry: identification of the metals, alloys, plastics and composites, operating and maintenance rules.
Expansion and effects on the assemblies.
Manufacturing process of metallic parts, molding, forging.
Frequent screwed, bolted, welded and stuck constructions.
Characterization of threads and bores, petroleum thread pitch.
Removable power transmission: keys, gears, hinged connections (joint...), cone interface.
Non-removable power transmission: shrink fitting.
Bearings: characterization, types, identification, assembly rules.
Seals of static systems (between flanges) and dynamic systems (mechanical seals on bearing boxes), analysis and selection of the materials.
Pipe, valves and main line accessories: identification, operation and maintenance rules.
Practical exercises: selection, identification and assembly of the ball bearings in a simple process pump.

ELEMENTS OF MAINTENANCE — 1 day

Tightening: importance of torque, order, techniques.
Alignment: understanding the operation, controlling the mating of piping.
Lubrication: properties and characterization of common oil and greases, lubricating systems.
Controlling the condition of parts at disassembly: corrosion, defaults, mating, wear, rupture.
Controlling the clearances at disassembly.
Practical exercise: mechanical completion of a pump on site (control and implementation).

ELEMENTS OF REPAIR — 1 day

Surface treatments and coatings.
Overlay welding and reconstitution.
Machining.
Casing repair with staples.
Expertise controlling: dye penetrant testing, metrology, ultrasonic, hardness testing.
Test and requalification: balancing, test, control of performances.

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Training - Maintenance Management

GESMAIN-EN-P | Face-to-face only | 5 days

This certifying course aims to bring elements related to the implementation of a modern and adapted maintenance policy (such as the risk-based maintenance policy), to define a continuous improvement of reliability, to consider failure direct and indirect costs, to be able to manage maintenance contracts as well as unit shutdowns or turnarounds

IFP Training Certificate

Advanced Certificate

Level

Skilled

Public

Maintenance engineers and managers from process industries, as well as production managers concerned by operation costs and equipment management

Objectives

Attendees will be able to implement the following skills:

- Know the proven maintenance policies (TPM, RCM, RBM, key performance indicators, preventive maintenance tools...) in order to be able to set goals in terms of company global efficiency
- Implement reliability measurement, analysis and improvement techniques (reliability indicators, assessment matrix, failure tree, FMECA, Pareto, Weilbull...)
- Know the necessary elements to define a subcontracting policy as well as to efficiently manage shutdowns
- Through various unexpected group exercises, to remind that multidisciplinary and reactivity are part of maintenance managers' jobs

Pedagogical & technical resources

- Applications and case studies illustrating the techniques studied
- Active pedagogy based on participants' experiences
- Short scenarios of the most frequent and the most serious key equipment failures, proposed by the trainer and analyzed by the group. Participants shall use their technical knowledge, reasoning skills, multidisciplinarity and operational capacities

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the

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specific needs of learners from the professional world

Program

MAINTENANCE POLICY & OBJECTIVES — 0.5 day

Integration of the maintenance policy to the plant policy. Financial, technical and workforce objectives.
Current methods and trends: criticality analysis, TPM, RCM, RBM, maintenance program optimization based on criticalities (redundancy, utilization rate, impact on production, age...), risk analysis, local conditions.
Different types of maintenance and respective importance: planned preventive, condition-based, predictive, corrective.
Importance of condition-based and predictive maintenances in modern maintenance policies, and particularly data importance (from SAP, PI, site report, root causes...) for the use of efficient methods (RED, e-monitoring...).
Application of the methods studied: criticality ranking, emergency levels, spare parts management.

RELIABILITY MEASUREMENT & FOLLOW-UP — 1 day

Descriptive statistics: reliability and reliability indicators, equipment performance monitoring in terms of availability, MTBF, MTTR...
Statistical functions and their applications to preventive maintenance. Main models, application to the search for preventive control optimization, equipment redundancy studies, standby equipment management.
Pareto law, identification of bad-actors.

RELIABILITY ANALYSIS & IMPROVEMENT METHODS — 1 day

FMECA (Failure Modes, Effects and their Criticality Analysis). Areas of application, basic techniques, probability assessment, common methodological errors. Action plan.
Failure trees, method principle.
RCM - Overall policy. Interest of the decision logics.
TPM - Total Productive Maintenance (global involvement to maintain the production tool).
Concept of asset integrity management as a SECE (Safety and Environment Critical Element).
Concept of machine learning: failure prediction by accumulation and cross analysis of process and equipment data.

MAINTENANCE COSTS & FAILURE COSTS — 1 day

Overall failure costs versus direct costs (materials, spare parts, repair contractors...) and indirect (shortfall in production or injection, quality defect, reputation...). Notion of cost efficiency: overall effectiveness, adaptation to petroleum industry and practical calculations.
Life Cycle Cost (LCC). Application to the choice of investments; application to the search for optimum equipment life duration.
Spare parts managements. Cost of inventory. Unsuitability of some conventional stock management calculations, cost of risk.
Computerized maintenance management.
System (CMMS) and related processes.

OUTSOURCING & SUBCONTRACTING — 0.5 day

Purpose, condition for efficiency. Why outsourcing? Which abilities to be kept? How to keep control?
Different types of contracts. When to use them? How to combine them?
Concepts of General Maintenance Operation Contract (GMOC), Maintenance and Inspection Engineering Contractor (MIEC).
Comparison between specific maintenance contract (“Specific Maintenance Contract” (SMC), “Original Equipment Manufacturer” (OEM)) and integrated maintenance contract (“Integrated Services Provider” (ISP)).

SHUTDOWN MANAGEMENT — 0.5 day

Detailed preparation. Cost control. Planning. Identification of critical operations.

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Work management. Worksite organization. Responsibilities. Decision-making. Safety goals.
Acceptances and commissioning. Quality management and safety. Procedures.
Reports and updates.

IMPROVEMENT PLANS — 0.5 day

From failure management to equipment management.
Lowering the tolerance threshold to defects and operators' involvement.
Maintenance plans by equipment item and equipment type.
Improvement plans, key performance indicators, dashboards. Maintenance audits.

TROUBLESHOOTING

The trainer regularly proposes short operational scenarios that are analyzed by the group. These are related to practical problems that maintenance managers may face on an Oil & Gas site (pump cavitation, compressor pumping, a defect on a control loop or safety system...).
To solve these problems, participants must use their technical knowledge, reasoning skills, multidisciplinarity and operational capability.

Sessions

Pau - From 11/16/2026 to 11/20/2026 — **4360 €/HT**

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Training - Management of Small Projects

GPP-EN-P | Face-to-face only | 5 days

Project Management Process applied to small projects implemented in operating facilities

Level

Knowledge

Public

Supervisors and engineers (process, plant projects, operations) and engineering contractor staff

Objectives

Attendees will be able to implement the following skills:

- Specify the steering elements when conducting studies
- List the planning and control elements to be implemented when running a small project

Pedagogical & technical resources

- Numerous examples from actual Refining/Petrochemical projects
- Case study

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PRELIMINARY ENGINEERING — 2.5 days

Specific constraints of plant projects (resources, organization, schedule, management of several simultaneous projects). Stage-gate process: various stages from conceptual design to start-up.
Roles and responsibilities of the project manager. Integrated team. Project initiation, basic engineering.
Reviews of the technical packages with owner. Cost estimating methods, accuracy, contingencies.
Project execution plan (PEP): organization, objectives, priorities, milestones, constraints. Interface management.
SHE design risk identification and assessment. Overview of the main methods (HAZID, HAZOP).
Project planning and scheduling. Long lead items. Critical path. Schedule optimization.

CONTRACTING & DETAIL ENGINEERING — 1 day

Engineering contract types. Advantages and drawbacks. Management of an umbrella contract.

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Detail engineering: regulatory compliance, owner corporate standards, deviations. List of deliverables. Most common technical pitfalls. Control of detail engineering documents.

PROCUREMENT — 0.5 day

Equipment procurement: purchasing, expediting, inspection, transportation. Quality control plan.

CONSTRUCTION - START-UP — 1 day

Construction strategy (use of maintenance or subcontractors). Construction management plan. Subcontractor field supervision and control. Field HSE management. Change management. Mechanical completion, punch-list items, commissioning, acceptance. Closure. Warrantee.

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Training - Gas-To-Liquid Technologies

GTLE-EN-P | Face-to-face only | 2 days

This course provides a technical and economic information regarding GTL processes

Level

Awareness

Public

Managers and engineers interested in the current developments of GTL technologies

Objectives

Attendees will be able to implement the following skills:

- List the main technologies involved in GTL production

Pedagogical & technical resources

- This session is adaptable to distance classroom
- Interactive course

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

NATURAL GAS MARKETS — 0.5 day

Production and consumption of natural gas in the world.
Main uses of natural gas.
Existing and potential routes for gas: pipelines, LNG, electrical power.
Natural gas reserves, associated gas: potential markets for GTL.

GTL TECHNOLOGIES — 1.25 days

Overview of full GTL production chain: synthesis gas, Fisher-Tropsch reaction, finishing.
Products quality from conventional versus GTL technologies.
Different processes for synthesis gas manufacturing and their reactions, catalysts, process schemes, past uses (methanol, etc.):

- Steam reforming.

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- Partial oxidation (POX).
- Auto-thermal reforming.

Fischer-Tropsch manufacturing processes: reactions, catalysts and process schemes.
Finishing processes for products upgrading, oligomerization and hydrocracking downstream Fischer-Tropsch units: reactions, catalysts and process schemes.

GTL PROJECTS & ISSUES — 0.25 day

Investments, operating costs: CAPEX, OPEX, costs for natural gas.
Marketing advantages, environmental incentives.
Economic advantages/drawbacks of GTL versus LNG.
Strategies of the different actors (producing countries of natural gas, process licensors, Oil & Gas companies, engineering companies).

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Training - Low-Carbon Hydrogen - H2BC

H2BC-EN-D | Distance only | 3 days

To provide the necessary technical knowledge on hydrogen, its value chain and its production methods, making it possible to understand and anticipate the challenges of the development of hydrogen as a solution in the energy transition

Level

Expert

Public

Engineers, technical executives or project managers involved in hydrogen logistics and/or production

Objectives

Attendees will be able to implement the following skills:

- describe the different modes of production, storage and transport of hydrogen
- understand the strengths and limiting elements of each pathway

Pedagogical & technical resources

- Highly interactive synchronous training. Quiz.
- Through our LMS, training documentation, applications and complementary content are shared.

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CONTEXT — 0.5 day

Brief overview of climate change: current situation, regulatory framework, impacts on businesses.
Priority applications for low-carbon hydrogen: energy carrier, chemical intermediates, industrial H2.
Hydrogen “rainbow,” low-carbon hydrogen: distinguishing between different terms, costs, orders of magnitude, advantages, and limitations.

HYDROGEN STORAGE AND TRANSPORT — 0.75 day

Physicochemical properties of hydrogen.
Regulatory aspects - Safety.
Packaging : Compression, liquefaction, hydrogen transformation .
Description of the different types of hydrogen storage:

- Buffer storage in production sites before transport.
- Natural cavities.

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- Cryogenic storage.
- Absorption or adsorption of hydrogen in a solid or liquid.

Description and use of the different modes of transport for hydrogen:

- Pipeline Transportation.
- Transport by road, rail and sea.

HYDROGEN USES 0.25 day

Hydrogen needs in the refining industry.
Hydrogen for mobility.
Manufacture of synthetic fuels.

FOSSIL HYDROGEN PRODUCTION 0.25 day

Grey hydrogen production methods: reforming and catalytic steam reforming of hydrocarbons, partial oxidation (POx), "hybrid" autothermal reforming (ATR) route:

- Schematic diagram, main operating conditions. Examples of achievements.
- Characteristics of the hydrogen produced.
- Energy considerations. Selection criteria.

FOCUS ON ELECTROLYSIS 0.5 day

Electrolysis: principles and reactions.
Presentation of the different technological blocks around the electrolyser: water treatment, hydrogen purification, storage, compressors and other equipment.
Dimensioning of the electrolyzer power supply. Specific constraints related to intermittency. Electrical auxiliaries.
The different types of electrolysers: alkaline, PEM and solid oxide:

- Description.
- Special features. Pros and Cons.
- Maturity and initial feedback.
- LCOH, Efficiencies, Current Density, and Power Requirements .

Possible recovery of the heat and oxygen produced by the electrolyser.

LOW-CARBON HYDROGEN PRODUCTION WAYS 0.75 day

Production of fossil hydrogen with CCS. The different modes of CO2 capture: cryogenics, amine process, other solvent-based processes, membrane-based processes, etc.
Water electrolysis with renewable energy.
Production from biomass: gasification.
Purchases of Renewable Certificates of Origin.
Other pathways: photoelectrolysis, native H2, plasma, etc.
Comparison of the different production methods.
Case Studies.

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Training - Low-Carbon Hydrogen - H2BC

H2BC-EN-P | Face-to-face only | 3 days

To provide the necessary technical knowledge on hydrogen, its value chain and its production methods, making it possible to understand and anticipate the challenges of the development of hydrogen as a solution in the energy transition

Level

Expert

Public

Engineers, technical executives or project managers involved in hydrogen logistics and/or production

Objectives

Attendees will be able to implement the following skills:

- describe the different modes of production, storage and transport of hydrogen
- understand the strengths and limiting elements of each pathway

Pedagogical & technical resources

- Highly interactive synchronous training. Quiz.
- Through our LMS, training documentation, applications and complementary content are shared.

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CONTEXT — 0.5 day

Brief overview of climate change: current situation, regulatory framework, impacts on businesses.
Priority applications for low-carbon hydrogen: energy carrier, chemical intermediates, industrial H2
Hydrogen “rainbow,” low-carbon hydrogen: distinguishing between different qualifiers, costs, orders of magnitude, advantages, and limitations.

HYDROGEN STORAGE AND TRANSPORT — 0.75 day

Physicochemical properties of hydrogen.
Regulatory aspects - Safety.
Packaging : Compression, liquefaction, hydrogen transformation.
Description of the different types of hydrogen storage:

- Buffer storage in production sites before transport.
- Natural cavities.

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- Cryogenic storage.
- Absorption or adsorption of hydrogen in a solid or liquid.

Description and use of the different modes of transport for hydrogen:

- Pipeline Transportation.
- Transport by road, rail and sea.

HYDROGEN USES 0.25 day

Hydrogen needs in the refining industry.
Hydrogen for mobility.
Manufacture of synthetic fuels.

FOSSIL HYDROGEN PRODUCTION 0.25 day

Grey hydrogen production methods: reforming and catalytic steam reforming of hydrocarbons, partial oxidation (POx), "hybrid" autothermal reforming (ATR) route:

- Schematic diagram, main operating conditions. Examples of achievements.
- Characteristics of the hydrogen produced.
- Energy considerations. Selection criteria.

FOCUS ON ELECTROLYSIS 0.5 day

Electrolysis: principles and reactions.
Presentation of the different technological blocks around the electrolyser: water treatment, hydrogen purification, storage, compressors and other equipment.
Dimensioning of the electrolyzer power supply. Specific constraints related to intermittency. Electrical auxiliaries.
The different types of electrolysers: alkaline, PEM and solid oxide:

- Description.
- Special features. Pros and Cons.
- Maturity and initial feedback.
- LCOH, Efficiencies, Current Density, and Power Requirements.

Possible recovery of the heat and oxygen produced by the electrolyser.

LOW-CARBON HYDROGEN PRODUCTION WAYS 0.75 day

Production of fossil hydrogen with CCS. The different modes of CO2 capture: cryogenics, amine process, other solvent-based processes, membrane-based processes, etc.
Water electrolysis with renewable energy.
Production from biomass: gasification.
Purchases of Renewable Certificates of Origin.
Other pathways: photoelectrolysis, native H2, plasma, etc.
Comparison of the different production methods.
Case Studies.

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Training - Operation of hydrotreatment processes

HDTS-EN-P | **Face-to-face only** | **4 days**

This course provides a better understanding of the operation of hydrotreatment units and helps participants to be better prepared to deal with disturbed situations

Level
Skilled

Public
Shift leaders, panel operators and experienced operators in charge of the operation of hydrotreatment units

Objectives
Attendees will be able to implement the following skills:

- Identify key physico-chemical characteristics of the process
- Describe the process steps & the way to monitor them
- Justify process and operating safety measures

Pedagogical & technical resources
Each case study is covered by handling using a high fidelity simulator, following several steps:

- objective of the case study, action by the trainees: operation/settings, stabilization
- analysis of the evolution of operating parameters up to the final state; mass balance, ratios, performance
- consequences for operation strategies
- The duration and content of the training course can be customized to the needs of the client site and the profile of the participants
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

STUDY OF INITIAL SIMULATED STEADY CASE — 1 day

Main process scheme, operating circuits, main pieces of equipment, control systems.

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Characteristics of the streams, operating conditions.
Significance of the process parameters of the units: mass balances, temperatures, pressures, recycle flow rates, amine washing efficiency, recontacting system.
Profile of important parameters along the unit (pressure, temperatures).
Analytical survey.

OPERATION OF THE UNIT: MAIN OPERATING PARAMETERS & OPTIMIZATION 2 days

Each operating parameter impact on operation is illustrated thanks to simulator handlings.
Reactor temperatures, pressure drop and H2 partial pressure, recycle rate, quench ratio, recontacting ratio...
Feed composition according to origins of constituents.
Severity of different processes according to feed and products specifications.
Protection of the catalyst along a run.
Give away and how to avoid it.
Optimization of stripping and drying operation.

TROUBLESHOOTING 1 day

Risks and hazards related to the process.
Safety and ESD system.
Operating deviations:

- Feed or hydrogen composition change.
- Amine washing failure, heater failure.
- Make-up gas or recycle gas compressor failure, feed pump failure.

Start-up procedures: main steps and explanation of the role of each step.

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Training - Heat Exchangers

HEDES-EN-P

Face-to-face only

5 days

This course provides detailed understanding of heat exchangers technology. It covers also thermal and mechanical calculation methods used to design exchangers and their performance monitoring

Level

Expert

Public

Engineers and staff from the technical and process departments of refining, petrochemical and chemical companies

Objectives

Attendees will be able to implement the following skills:

- List advantages and drawbacks of TEMA Types and associate the most appropriate type with operating conditions and fluids properties
- Describe the heat exchange laws and identify key parameters impacting the exchange coefficients and pressure drops
- Define the required data used in HX design software and analyze the output file
- Elaborate, from a process data sheet, a TEMA specification data sheet used for HX construction

Pedagogical & technical resources

- A case study is organized throughout the training program to select, design and check performances of a single phase shell and tube heat exchanger, from the process data sheet to the TEMA specification data sheet
- Study of reboilers and condensers
- Special emphasis on interaction between mechanical aspects and process requirements in the thermal and hydraulic design of heat exchangers

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

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HEAT TRANSFER LAW APPLIED TO HEAT EXCHANGERS — 0.75 day

Heat exchange conditions: convection coefficients, resistance caused by the walls and by fouling.
Overall heat transfer coefficient. Mean heat potential in a heat exchanger as a function of fluid distribution, specific case of phase change. Transferred heat flow rate across an installed surface. Influence of installed area and fouling.
Application:

- Evaluation of exchange area requirements as a function of fluid flow distribution.
- Thermal performance follow-up and prediction.

TEMA STANDARD TUBULAR HEAT EXCHANGERS - TECHNOLOGY & SELECTION CRITERIA — 0.5 day

TEMA standard heat exchangers: nomenclature, different types of shell, floating heads and fixed front head.
Selection criteria, advantages and drawbacks of the different types.
Geometrical characteristics of TEMA heat exchangers and technological constraints.
Technological solutions to improve film coefficient or reduce shell side pressure drops: tubes inserts, type of baffle...
Application: selection of a TEMA type and fluid flow allocation according to a process data sheet.

THERMAL & HYDRAULIC DESIGN - PERFORMANCE FOLLOW-UP — 3.25 days

Heat exchanger design procedure: fluid flow allocation, TEMA type selection, heat exchange area estimate, area organization (tubes diameter and length, tube pattern and pitch), baffle (type, spacing and cut), shell side stream analysis, performance and geometrical hypothesis checking, acceptance criteria, reconsideration of initial design (number of shell in series or in parallel, number of tube passes...).
Vibrations induced by flow in a shell: prediction, severity criteria, influence on design.
Condensation or vaporization performance: two phase flow (patterns and pressure drop), condensation modes, film condensation, characteristics, boiling mechanisms, film boiling and convective boiling coefficient.
Hydrodynamics of thermosiphon reboilers.
Application:

- Thermal and hydraulic design of a single-phase heat exchanger.
- Initial design of condenser and reboiler.

PLATE TYPE HEAT EXCHANGERS — 0.5 day

Main type of plate heat exchangers: advantages and drawbacks. Limitations and application area.
Main design rules and arrangement possibilities (parallel, series...).
Application: heat exchange area to install in case of a perfect counter-current plate type HX.

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Training - HSE Engineer

HSEENG-EN-P | Face-to-face only | 60 days

This course provides an in-depth knowledge of safety and environment issues in Oil & Gas production activities: from design to facilities operation

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers (particularly field/project engineers) called on to take the position of HSE or safety engineer

Objectives

Attendees will be able to implement the following skills:

- Describe the overall production chain and explain main techniques and equipment used in the Oil & Gas facilities
- Detail HSE aspects regarding production operations, construction, maintenance works, projects/logistics
- Describe HSE management roles and responsibilities, set-up and implement HSE management system
- Contribute to safety engineering studies, incident analysis and investigation reporting, HSE monitoring

Pedagogical & technical resources

- Highly interactive training by industry specialist lecturers, with numerous teamwork sessions
- Numerous applications, case studies and experience feedback

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

DOWNHOLE PRODUCTION — 5 days

Fundamentals of reservoir engineering, drilling, completion and well servicing.

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OIL & GAS FIELD PROCESSING — 10 days

Fundamentals of reservoir engineering, drilling, completion and well servicing.
Fundamentals of thermodynamics applied to effluent processing.
Crude oil treatment.
Production water treatment and injection.
Gas processing and conditioning.
Overview of static equipment. Piping, valves, thermal and storage equipment.
Overview of rotating equipment. Pumps, compressors and gas turbines.
Instrumentation and process control.

HSE MANAGEMENT — 10 days

HSE management system.
Occupational health and safety management.
Human factors and responsibilities - HSE culture and HSE leadership.
HSE management in projects.
HSE management of contractors.
HSE management of logistics.
Undesired events reporting and investigation.
HSE audits.

HSE IN PRODUCTION & MAINTENANCE ACTIVITIES — 10 days

Hazard identification and risk assessment of surface processing operations: hazardous products, flammability, fluid behavior.
Utilities, flares & drains. Safe isolation of plant and equipment (LOTO, degassing-inerting, ventilation...).
Risk assessment of maintenance and construction works.
Permit to work system.
Emergency response. Strategies and crisis management.

SAFETY ENGINEERING — 10 days

Process hazard analysis. HAZID studies, HAZOP studies. Consequence analysis methodology.
Major hazard assessment & quantitative risk assessment.
Safety instrumented systems.
Fire detection and protection systems.

ENVIRONMENTAL MANAGEMENT — 5 days

Environmental management system.
Environmental and social impact assessment. Projects.
Applicable technologies for impact mitigation.
Waste management planning.
Oil spill contingency plan.

ASSET INTEGRITY — 5 days

Introduction to Asset Integrity Management.
Criticality and Risk Assessment Tools. FMECA, FTA.
Inspection and test.
Corrosion.
Maintenance and inspection based on failure risk.
Implementation and challenges.

HSE IN DRILLING & WELL INTERVENTION OPERATIONS — 4 days

Hazard identification and risk assessment of drilling operations.
HSE management of drilling, completion, rig move and well intervention operations.

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HSE evaluation of drilling contractors.

FINAL ORAL ASSESSMENT — 1 day

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Training - HSE Management

HSEMGT-EN-P | Face-to-face only | 5 days

This course provides the knowledge required to implement and follow-up a HSE management system, in order to ensure a higher level of safety and more environmentally-friendly business activities

Level

Knowledge

Public

Engineers expected to assume a HSE engineer position, business managers seeking to acquire comprehensive HSE management knowledge

Objectives

Attendees will be able to implement the following skills:

- Suggest a relevant HSE organization in order to fulfil local needs
- Identify and explain the different elements of a general HSE management system based on a risk management approach
- Follow adequately local HSE rules and regulations, and contribute to their improvement
- Contribute to building an HSE culture within their organization, which will allow avoiding incidents and accidents
- Prepare HSE audits and be familiar with continuous improvement processes

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OVERVIEW OF HSE MANAGEMENT SYSTEM — 0.25 day

Historical approach. Initial development and current standards.
Introduction to integrated management system. Certification.

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Fundamentals of HSE management system.
General structure of HSE management system. Policy and elements.

MANAGEMENT COMMITMENT & LEADERSHIP - HSE CULTURE — 0.5 day

Leadership. HSE leadership characteristics. Roles of safety leaders. Communication and motivation.
Establishment of a HSE culture throughout the organization. Importance of communication.
HSE competence assurance. Training matrix.

RISK MANAGEMENT — 1.5 days

Introduction to risk management. Risk assessment process.
Establishment of risk assessment and control - Concepts, strategies and objectives.
Risk management tools, hazard identification and risk register.
Establishment of a corporate risk matrix.
Environmental and social impact assessment process.
Health and ergonomics management.
Human factors and human error.
Management of change procedure.
Downgraded situations and simultaneous operations.
Safety design and asset integrity assurance - Main concepts.
Identification and management of safety critical elements.

HSE PLANNING & CRISIS MANAGEMENT — 0.75 day

Fundamentals of HSE management in projects.
HSE management of contractors. Contractor selection process.
Structure and elements of HSE plans.
Environmental management plans.
Structure for Emergency Response Planning. Establishment of tiers and development from risk assessment information.
Crisis management organization and management of information and resources during emergencies.

ELEMENTS FOR EXECUTION & CONTROL — 0.5 day

Tools for risk management of onsite activities:

- Job safety analysis.
- Permit to work system.
- Observation and HSE awareness programs.
- Pre-start up review.

Logistics HSE management.

AUDITS & CONTINUOUS IMPROVEMENT — 1.5 days

Strategies for establishment of HSE objectives. Main key performance indicators in the industry.
Undesired events reporting and investigation procedure. Accident investigation workshop.
Environmental and social monitoring.
Public reporting, sustainability reporting.
Audit planning.

Sessions

Pau - From 11/16/2026 to 11/20/2026 — **4360 €/HT**

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Training - Selective Hydrogenation of the Steamcracker

HYDVAPO-EN-P | **Face-to-face only** | **3 days**

To improve the knowledge of the selective hydrogenation processes of C2, C3, C4 cuts and pyrolysis gasolines (Pygas) for better controlling the operation

Level

Skilled

Public

Operating personnel of the steam cracker manufacturing units: experienced operators, panel operators, shift leaders and all technicians involved in the operation of these sections

Objectives

Attendees will be able to implement the following skills:

- Identify key physico-chemical characteristics of the process
- Describe the process steps
- Justify process and operating safety measures

Pedagogical & technical resources

- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Case studies handled in groups, based on typical situations of conduct of the sections studied
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

SELECTIVE HYDROGENATION OF THE C2 CUT — 1.25 days

Origin, characteristics and valuation of the C2 cut: origin and physical state of the cut, average composition, specifications of ethylene produced.
Identification of the impurity to be removed. Selection of the implementation of the treatment in relation to the nature of the impurity.

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Location and operating principle of the selective hydrogenation section within the steamcracker: arrangement of the reactors, characteristics of the reactions involved in the process.
Nature, properties and mechanism of action of the catalyst: typical composition, activity, selectivity, main steps of the catalytic act, main well-known poisons (carbon monoxide, hydrogen sulfide, green oils...).
Analysis of the operating conditions: simplified process flow diagram (main process control loops, standard operating conditions, available analyzers) - Operating parameters (composition of the feedstock and hydrogen-rich gas, associated flow rates, CO content, molar ratio H2/acetylene, pressure, start-up temperature and Δt of the reactor...) - Performance monitoring (conversion rate, ethylene gain) - Analysis of some schematics of the DCS.
Case studies of adjustment: materialization of the evolution of the process using defined steps according to the variation of operating variables - Possible optimization points.
Possible major incidents, process safety and associated procedures.

SELECTIVE HYDROGENATION OF THE C3 CUT 0.5 day

Origin, characteristics and valuation of the cut C3: origin and physical state of the cut, average composition, specifications of the propylene produced.
Identification of the impurities to be removed. Selection of the implementation of the treatment in relation to the nature of the impurities.
Description of the main differences between the selective hydrogenation of the C2 section and that of the C3 section: location of the section, reactions involved, catalyst.
Simplified process flow diagram, operating conditions, driving parameters, performance monitoring, digital driving overviews and associated modules.
Case studies on the tuning of the unit: evolution of the process further to the modification of operating variables according to reference adjustments - Possible optimization points.
Possible major incidents, process safety and associated procedures.

SELECTIVE HYDROGENATION OF THE C4 CUT 0.5 day

Origin, characteristics and valuation of the cut C4: origin and physical state of the cut, average composition, specifications of the butadiene 1-3 produced.
Identification of the impurities to be removed, associated constraints - Simplified process flow diagram.
The main differences between the selective hydrogenation of the C4 cut and those of the C2 and C3 cuts.
Operating conditions and performances.
Process safety and associated procedures.

TREATMENT OF PYROLYSIS GASOLINES BY HYDROGENATION 0.75 day

Origin, characteristics and valuation of the C5+ cut (Pygas): origin and physical state of the cut, average composition.
Identification of the impurities to be eliminated, associated constraints - Simplified process flow diagram.
Selective hydrogenation 1st stage.
Types of catalysts according to the content and nature of the sulfur compounds of the feedstock.
Operating conditions and performance measurement.
Process safety and associated procedures.
Hydrogenation 2nd stage.
Role of section.
Types of catalysts.
Operating conditions and performance.

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Training - Instrumentation and Process Control

ICP-EN-P | Face-to-face only | 5 days

This course provides a good overview of instrumentation and control systems and facilitates communication with experts

Level
Skilled

Public
Junior engineers and technicians from process industries

Objectives
Attendees will be able to implement the following skills:

- Read and understand a P&ID
- Identify the technology used for field instrumentation

Pedagogical & technical resources

- 50% of practice on mini process skids with industrial equipment
- Illustration of process control using dynamic simulators (IndissPlus de CORYS)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INSTRUMENT LOOPS — 0.5 day

Function, constitution, signal types. Tag naming conventions and symbolization.

SENSORS & TRANSMITTERS — 1.5 days

Technologies to measure and detect the pressure, temperature, level and flow.
Working principles. Selection criteria according to process needs.

CONTROL VALVES & ON/OFF VALVES — 1 day

Technologies and working principle.

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Specification criteria.
Accessories: limit switches, solenoid valves, positioners...

PROCESS CONTROL — 1.5 days

Controller role and performance criteria.
ON/OFF and PID controller.
Conventional control schemes: split-range, cascade, ratio, override, feed forward.
Introduction to advanced process control.

CONTROL & SAFETY SYSTEMS — 0.5 day

Role, architecture and functions of a Distributed Control Systems (DCS). Separation of control and safety systems.
Introduction to Safety Instrumented Systems (SIS).

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Training - General Layout

IMPLANT-EN-P | Face-to-face only | 3 days

This course provides knowledge on how to elaborate a general layout and take into account the various constraints

Level
Knowledge

Public
Engineers and technicians involved in Oil & Gas projects

Objectives
Attendees will be able to implement the following skills:

- Develop an implementation plan taking into account constraints: regulations, disciplines, suppliers, key project milestones
- Specify the optimization elements of an implementation
- List elements of a design review

Pedagogical & technical resources

- Develop a general arrangement on an easy case
- Review a layout using HAZID methodology

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PRELIMINARY LAYOUT — 1 day

Regulatory aspects: safety distances, noise, environment, works. International standards.
Use of blocs diagrams, process flow diagrams and piping and instrumentation diagrams.
General layout: process units, storage facilities. Utilities. Technical and administrative buildings. Site access and escape ways. Tank farm layout.

KEY POINTS FOR LAYOUT — 1 day

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Review of constraints generated by the various disciplines. Associated layout criteria.
Health, Safety and Environmental constraints. Use of the results of Quantitative Risk Assessment (QRA). Design inherently safer. Safety distances. Area classification. Ergonomics. Noise concerns.
Operation and maintainability: lifting and storage area, access to equipment.
Planning and scheduling: data availability at each project stage, management of holds and change requests.

REVIEWS & OPTIMIZATION — 1 day

Design reviews using HAZID methodology.
Final layout including validated actions from reviews or equipment supplier data. Use of 3D models.
Inter-unit connection optimization. Storage area and paved areas optimization.

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Training - Column Internals

INCOL-EN-P | Face-to-face only | 2 days

This course provides a thorough and practical understanding of the working principles and use of trays and packing installed in many columns for distillation, absorption, stripping, washing, etc It covers as well the main design issues

Level

Expert

Public

Engineers and supervisory staff in the refining, petrochemical and chemical industry, involved in the design, selection or operation of the internals in distillation columns or their equivalent

Objectives

Attendees will be able to implement the following skills:

- List the different types of equipment, their strengths, limitations and areas of application
- Identify the basic elements needed for their sizing

Pedagogical & technical resources

- Active participation of trainees with exercises using an equipment sizing software
- Parts of or the whole session customizable to a virtual remote classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNOLOGY & FUNCTIONING OF TRAYS — 1 day

Basics of mass transfer between liquid and vapor: importance of the interface area, viscosity and relative volatility.
Definition of some working parameters: efficiency, capacity, flexibility, pressure drop, etc.
Different types of trays: with or without downcomers.
Different types of contacting systems for the active area: bubble caps, fixed or mobile valves.
Hydraulic working and pressure drops.
Troubles such as flooding, weeping, fouling, etc.

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Main parameters to take into account in the design of internals.
Specific features for multi-pass trays.
Equipment for transition zones as flash zone, changing of pass number, etc.
Aim of high performance trays and working principles. Advantages and fields of use.
New technology trays and implementation in the near future.
Example:

- Simulation of tray design; representation of trays in operation (video).
- Implementation of HP trays and feedback information.

TECHNOLOGY & FUNCTIONING OF PACKED BEDS 0.75 day

Random packing, structured packing, grids.
Technology of a packed bed in operation.
Operating range and pressure drop.
Recent evolution of packing.
Liquid or vapor distributors, collectors and redistributors.
Impact on the working and performance of packed beds.
Example:

- Representation of packing in operation (video); implementation of packing and evaluation of performances.
- Presentation of tests in the manufacturer's workshop.

COMPARISON & TROUBLESHOOTING OF BEDS & PACKINGS 0.25 day

Advantages and drawbacks of trays and packed beds, costs.
Respective technical performances: capacity, pressure drops, flexibility, implementation.
Detection of disturbances in the field and data analysis.
Potential solutions and efficiency.
Gammametry: method and examples of diagrams.
Example:

- Revamping an existing column.
- Case study of disturbed equipment, diagnosis and remedy.

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Training - Upstream Maintenance Engineer

INGMAIN-EN-P | Face-to-face only | 60 days

This training provides the technical knowledge to quickly and successfully integrate maintenance or design teams of Oil & Gas production facilities

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers and technical executives, wishing to get specialized in the maintenance of Oil & Gas and energy production installations. Junior engineers with one of the following positions: site engineer, support engineer, design/engineering engineer or project engineer. Senior engineers in the framework of a retraining or skill development

Objectives

Attendees will be able to implement the following skills:

- Explain operation and maintenance of static equipment (well head, pipe, line elements, tanks, thermal equipment...)
- Master the technology, working principle, operation, maintenance and safety of the rotating machines used in Oil & Gas production and energy production
- Understand the behavior of items such as bearings and seal packings in the machines
- Identify the electrical power production and distribution, the instrumentation and the control of the systems
- Participate in or carry out the maintenance management of one or several production sites

Pedagogical & technical resources

- Interactive animation by industrial, maintenance and energy specialists
- Numerous applications and illustrations
- Understanding of all energy and the system maintenance areas
- Disassembly, expertise, measurements, re-assembly of pumping equipment in an equipped workshop
- Practical application of new knowledge: site energizing project, organization of major machines overhaul, use of manufacturer folders... (10 days and assessment by a jury)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including final project presentation in front of a mixed jury of assessors composed of Company representatives and IFP Training Lecturers

Prerequisites

No prerequisites are necessary to follow this course

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Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

WELL EQUIPMENT & WELL EFFLUENT TREATMENTS — 2 days

Notions of drilling/completion. Artificial lift: pumping, gas lift. Oil field processing (stabilization, dehydration, sweetening) and water processing (production and injection water). Gas processing and conditioning (dehydration, sweetening).

TECHNOLOGY & MAINTENANCE OF STATIC EQUIPMENT — 3 days

Wellhead, pipe, fittings and line equipment, safety valve, tanks, pressure vessel. Thermal equipment: heat exchangers, boilers, heaters, condensers. Standards, design, operation, inspection, maintenance. PFD, P&ID, isometric drawings.

TECHNOLOGY & MAINTENANCE OF PUMPS — 5 days

Pumping fundamentals (pressure, flow rate, conservation of energy, mechanical and hydraulic powers...). Dynamic pumps. Functional approach: different types of dynamic pumps and integration into the processes; generic functional study (process, sealing, supporting/guiding, lubrication). Positive displacement pumps: different types (piston pumps and rotary pumps); operating principles, influence of the clearances, internal leaks, impact of the type of product on the flow rate and pressures.
Preventive maintenance, condition-based maintenance (measurement of vibrations, oil analysis, thermography), corrective maintenance (troubleshooting and repair techniques). Analysis of manufacturer folders and P&ID.

PRACTICE IN MECHANICAL WORKSHOP — 5 days

Technical drawing convention: 2D and isometric views, projections, sections and cut-away views, perspectives, technical vocabulary. Parts and mechanical systems dimensioning, ISO tolerances and main adjustments. Dimensional tolerances and operating clearance. Geometric tolerances and surface condition characterization. Presentation and implementation of the tools in a metrology workshop, performances and rules of use. Disassembly, expertise, measurements and re-assembly of single-shaft and double-shaft ends pumping equipment.

TECHNOLOGY & MAINTENANCE OF COMPRESSORS — 5 days

Compression fundamentals (ideal gas, real gas, isentropic compression, polytropic compression).
Dynamic compressors: different types and integration into the processes; technology of essential and auxiliary elements: stator, rotor, bearings, thrust, sealing, oil circuit, sealing devices... Reciprocating compressors: different types and integration into the processes; technology of essential and auxiliary elements (cylinder, piston, valves, sealing, spacers, crankshaft, rod, moving part and cylinder lubrication, cooling circuit, sealing devices, connection to the flare). Rotary compressors (screws, liquid ring, lobes, vanes). Preventive, condition-based maintenance. Troubleshooting and repair techniques. Analysis of information folders and P&ID. Troubleshooting.

TECHNOLOGY & MAINTENANCE OF DRIVING MACHINES — 5 days

Gas and steam turbines. Diesel motors. Technology, working principle, main and auxiliary equipment operation and maintenance. Operation and performances (impact of the operating conditions). Driven machine/driving machine coupling.

COMMON ELEMENTS OF MACHINES & STRUCTURES — 5 days

Moving part lubrication: grease, oil (designation, characteristics). Pressurized and bubbled lubrication, sealing

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rings. Rotors and shafts: balancing (unbalance, eccentricity, balancing class) and shafts geometric alignment. Roller bearings (designation, internal clearances, assembling rules), plain bearings (calculations, incidents, instability) and magnetic bearings. Shaft output seals: braided packings, mechanical seals (functioning, description of the different types, conditions of stability, auxiliaries); P&ID study of a complex mechanical seal, of a centrifugal compressor. Couplings and alignment. Machine shaft alignment techniques. Corrosion: main types. Corrosion prevention and basics of inspection.

TECHNOLOGY & MAINTENANCE OF ELECTRICAL EQUIPMENT — 5 days

Sources of electrical power (alternator, generator) and motors (alternate and direct current): functioning, technology, operation, maintenance, safety. Electrical power distribution and networks: constitution of HV and LV networks, distribution philosophy, control and protection elements, transformers, circuit breakers; redundancy of sources and supply means. Earthing and neutral systems. Protection against the electrical risks and hazardous areas and ATEX standards.

INSTRUMENTATION, CONTROL, SAFETY INSTRUMENTED SYSTEMS — 5 days

Simple and complex measuring devices, technologies and functional study. Signals and signal transmission. Control and safety devices (control valve, on/off valves). Control structures: role, working principle, direct or inverted action, operating modes. Control loops: simple, cascade and split-range. Distributed Control Systems (DCS) and Safety Instrumented Systems (SIS): safety loops, HIPS, ESD, EDP, F&G technologies.

HSE DURING MAINTENANCE WORKS — 5 days

Identification of the hazards and specific risks on site, in maintenance situation. Job safety analysis procedures and steps, permit to work. Audit and improvement of HSE performance. Safety in construction and maintenance works (lifting and rigging, sand blasting, test, works on electrical equipment, in confined spaces, welding...). HSE management system: SIMultaneous OPerationS (SIMOPS), management of changes, downgraded situation, human factors.

MAINTENANCE MANAGEMENT — 5 days

Maintenance policies and types: financial objectives. Maintenance cost versus failure cost. Different types of maintenance and respective importance: systematic preventive, condition-based, predictive, corrective. Preventive maintenance tools, measurement, follow-up and reliability engineering (fault tree, Pareto, identification of the “bad actors”). Methods and current trends: criticality analysis, Japanese and American methods, risk analysis-based decisions. Studied methods application: criticality rankings, levels of emergency, stocks of spare parts. Outsourcing and subcontracting, shutdown management, improvement plans.

PROJECT: MAINTENANCE ENGINEERING - JURY — 10 days

During the final project, participants will work as teams and develop a project related to the maintenance, the energizing, the functioning of the support, the management of a machine overhaul, a manufacturer brief... This 10-day project is based on existing data. Participants are coached all along the project to help them reach the objectives set: writing a report and presentation to a jury of personnel from the company and IFP Training.

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Training - Introduction to hydrogen compression

INTCOHY-EN-P | Face-to-face only | 2,5 days

This course gives the key points of hydrogen compression and compressors operation, no matter the use (hydrogen production, transportation, storage, end use)

Level

Awareness

Public

Engineering staff involved in hydrogen compression

Objectives

Attendees will be able to implement the following skills:

- Explain the influence of operating parameters on compressor performance taking into account the physical phenomena related to compression and a change in gas nature
- List the components of each compressor type and their importance to machine selection and sizing

Pedagogical & technical resources

- Interactive lecture
- Use of actual machine parts and open machines
- Study of actual drawings, cutaways, PIDs...

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

COMPRESSORS TECHNOLOGY — 1 day

Hydrogen compression: compressors types. Practical implementation through a given process.
Technology: Casing, stationary and rotating parts, according to the machine type.
Auxiliaries: lube oil, sealing,... according to the machine type.
Safety devices: vibrations, bearings/thrust bearing temperatures, oil pressure... according to the machine type.
Natural gas compressor technology vs hydrogen one.
Demonstrations: study of actual parts and open machines.

COMPRESSORS PERFORMANCES — 1 day

Gas Compression: key points. Natural gas compression vs hydrogen compression.
Compression mechanism through a compression stage, according to the machine type.
Operating limits, according to the machine type: discharge temperature, surge, maximum pressure...

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Performance vs operating conditions: pressure ratio, suction conditions, rotation speed...
Vibrations, critical speeds.

COMPRESSORS OPERATION AND SURVEY — 0.5 day

Flow control.
Case study: flow control vs various operating conditions.
Start-up and shutdown. Associated risks.
Compressor survey key points.

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Training - Refining and Petrochemicals Synergies

IRP-EN-P | Face-to-face only | 2 days

This course provides a complete review of the main refining and petrochemicals specificities, as well as the identification of the possible synergies. It highlights the economic gains achievable from refining-petrochemicals integration

Level

Skilled

Public

Staff from refining and petrochemicals involved in production, planning, procurement, marketing, management control and investment

Objectives

Attendees will be able to implement the following skills:

- Describe the main specificities of the refining and petrochemicals sectors
- Identify the possible synergies between refining and petrochemicals

Pedagogical & technical resources

- Quiz, examples
- Case studies and exercises in team work

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TECHNICAL REVIEW OF REFINING & PETROCHEMICALS — 0.5 day

Main petroleum and petrochemicals products: key product specifications review.
Refining and petrochemicals schemes.
HSE specifications: refining (H2S, etc.), petrochemicals (product instability, etc.).

SYNERGIES BETWEEN REFINING & PETROCHEMICALS — 1 day

Utility exchanges: H2, gas, fuel.
Supply: ethane, LPG, naphtha, atmospheric gasoil, vacuum distillate.

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Product exchanges: pyrolysis gasoline, olefins.
Common treatment of the C4 cuts: BTX (Benzene-Toluene-Xylene) extraction.
Pooling services.

REFINING & PETROCHEMICALS ECONOMICS — 0.5 day

Refining and petrochemical margins and costs.
Location and unit severities effects.
Gains due to synergies.
Case study: economics of a refinery, of a steam cracker and of the integration of both (with some synergies).

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Training - Place and Role of Equipment in Refining and Chemical Processes

ITREQ-EN-P | Face-to-face only | 6 days

This course provides a deep knowledge of the role and operating conditions of specific equipment used in various processing plants as well as a better understanding of process users: their processes, vocabulary, work environment, etc

Level

Awareness

Public

Engineers and/or technicians. Suppliers or subcontractors of the Oil & Gas processing sector or the refining and chemical industry

Objectives

Attendees will be able to implement the following skills:

- Define the role and integration of the selected material in the processes studied
- Identify standard operating conditions
- Identify impacts of changing operating conditions on this equipment

Pedagogical & technical resources

- Interactive course
- The use of 2D/3D photos and videos makes it possible to understand the size of the presented devices and units

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

EXAMPLE OF COURSE CONTENT RELATED TO COMPRESSORS

For each unit, the following items are discussed:

- Role and principle of the process, simplified process flow diagram, role of the compressor in the process.
- Normal operating conditions and impact of various modifications on the operation of the compressor.

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- Particular operating conditions: shutdown, start-up, regeneration of the catalyst, decoking, etc.

COMPRESSORS IN OIL & GAS PROCESSING & TRANSPORTATION — 3 days

Production of natural gas and associated gas: natural production and reinjection compressors.
Secondary oil recovery: gas lift, associated gas reinjection compressors.
Gas transportation by pipe: recompression station.
Gas storage: surface, underground.
LNG production and treatment: conventional units, ssLNG.

COMPRESSORS IN REFINING PROCESSES — 2 days

Initial fractionation of crude oil: overhead gas compressor.
Catalytic reforming: recycle, make-up, recontacting, regeneration compressors.
Hydrorefining: recycle and make-up compressors.
Fluid catalytic cracking (FCC): wet gas compressor and air blower.
Hydrocracking: recycle and make-up compressors.
Alkylation: cryogenic compressor.
Visbreaking: wet gas compressor.
Coker: wet gas compressor.

COMPRESSORS IN THE PETROCHEMICAL/CHEMICALS INDUSTRY — 4 days

Steamcracking: cracked gas and cryogenic compressors.
Commodity polymers: on-purpose propylene production (metathesis, PDH, MTP/MTO...), polyethylene and polypropylene production (gas and liquid phase), ethylene oxide production, styrenics production: transfer, refrigeration or recycle compressors, according to the process scheme.
Ammonia: air compressor, syngas compressor, refrigeration compressor.
Urea: CO2 compressor.
Nitric acid: turbocompressor, single and dual pressure units.
Sulfuric acid: air blower.
Methanol: make-up compressor, syngas compressor, air blower.

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Training - Supply Chain Management

LOG-EN-P | Face-to-face only | 3 days

This training provides a deeper knowledge of all technical, economic, administrative and environmental constraints of the petroleum logistics from the refinery to the gas station to optimize it more effectively

Level

Skilled

Public

All personnel in the petroleum industries, distributors, large consumers concerned with supply logistics issues, transportation and storage

Objectives

Attendees will be able to implement the following skills:

- Set up a logistics plan and establish different modes of supply
- Establish the characteristics between the various tools of storage and transportation
- Analyze the economic aspects of a supply chain

Pedagogical & technical resources

Case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION & PRINCIPLES

Definition: what is logistics? What is a supply chain?
Principles of the distribution of petroleum products.
Review of activities, supply chain link production to consumers.
Definition of actual tools.
Implementation of supply chain schema.

STORAGE MANAGEMENT

Factors of entry points (refiners and import terminals).

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Factor of exit points (to consumers).
“Pull” and “push” modes.
Basic tool for stock management.

TECHNICAL ASPECTS OF STORAGE

Review of the different storages (above ground and underground).
Operation equipment and control.
Stocks measurements.
Losses (tank breathing, product movement, loss control).
Flow measurements. Safety equipment.

ECONOMICS OF STORAGE & TRANSPORT OPERATIONS

Cost notion. Storage size. Investments. Maintenance.
Cost breakdown for mixed products and petroleum products.
Maintenance policy and costs. Distribution cost pricing policy.

SECURITY STORAGES

Why security storages?
IEA mission. Example in different countries in the world.
Review of technical problems due to long term storage.

SHIPPING

General features.
The Market and its players-fixing of the freight rate (Worldscale).
Chartering contracts (voyage charter, COA, time charter...).
Risk control and environmental protection.

SUPPLY CHAIN DESIGN & METHODOLOGICAL APPROACH

Analysis of the Industry. Organization analysis. Process analysis. Location analysis.
Operational optimization. Status and alternatives’ analysis.
Key Performance Indicators.
Benchmarking context.

CASE STUDY

Case study based on an actual situation and containing applications of most of the main principles explained.

CASE STUDIES (TREATED ALL ALONG THE COURSE)

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Training - Main Polymers PE/PP/PS

MAIPOLY-EN-P | Face-to-face only | 5 days

To provide comprehensive information on polymers and polymerization processes used to produce polyethylenes, polypropylenes and polystyrene

Level
Skilled

Public
Engineers and technical staff interested in the manufacturing of commodity polymers

Objectives
Attendees will be able to implement the following skills:

- Understand the global technical and economical structure of commodity polymers, by far the biggest outlet of petrochemistry
- Master the link between product slate and process selection in function of company marketing strategy
- Know the main industrial commodity polymers processes available for licensing, and their main characteristics
- Be aware of the main industrial safety and operational problems

Pedagogical & technical resources
Applications and case studies treated in small groups, based on typical situations encountered in the normal or unsettled operation of these units

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MAJOR POLYMERS — 0.5 day

Various polymer families: commodities, engineering, high performance polymers.
History of polyethylene development.
History of polypropylene development, the youngest of all commodity polymers. Various types of grades (homo, block, random, isotactic, syndiotactic, atactic...); their main applications.
Project management in petrochemical industry. Patent strategy. Staging of projects Order of magnitude of

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investment costs.
Fixed and variable cost for site production and outside logistics.
Polymer pricing mechanisms. Notion of economical spread. Explanations of the causes of polymers wide price fluctuations.

CATALYTIC SYSTEMS USED FOR POLYOLEFINS PRODUCTION — 0.5 day

Review of the various types of catalytic systems for polyolefins.
Mass and heat transfer in the heterophasic polymerization of polyolefins.
Multigrain model of the growing particles and variations around this model.

IMPLEMENTATION OF POLYMERIZATION - MAIN POLYETHYLENE & POLYPROPYLENE PROCESSES — 1 day

Techniques implemented in polymers production: solution, bulk, emulsion, suspension or slurry, gas phase. Advantages and drawbacks of these techniques, consequences for process implementation.
Main processes involved in production of polyethylene and polypropylene. Basic schemes and average operating conditions. Influence of operating parameters (temperature, pressure, reactants proportion) on product quality.

POLYETHYLENES - POLYPROPYLENES & OTHER COMMODITY POLYMERS — 2.5 days

General presentation of high pressure and low pressure polyethylene processes, with the various types of polymers grades they can produce. Low, medium, high, ultra-low density...; narrow, broad molecular weight distribution; low, high melt indexes...
Main applications per family of grades.
High pressure processes. Heat transfer in reactors and conversion rate. Comparison of autoclave, tubular mono-injection, tubular multiple injection reactors; consequences on product quality. Specific equipment technology used in HPPE (hypercompressors, letdown valve...).
Safety risks associated with ethylene decomposition.
Main low pressure catalytic processes. Main characteristics of catalyst and reactor types. Which market do they serve? Announced developments.
Various polymerization processes available for polypropylene production (gas phase, loop, liquid pool...). Staged polymerization for broad molecular weight distribution and impact copolymers. New development with single reactor double reaction zone.
Polymer finishing. Extrusion. Storage. Logistics. Supply chain.
Main safety issues. Catalyst killing system in case of emergency.

POLYSTYRENE PROCESSES — 0.5 day

Main design and operation characteristics.
How to treat run-away in case of thermal initiation.

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Training - Engineering Studies during Project

MANEI-EN-P | Face-to-face only | 5 days

Technical understanding and sequencing of engineering studies

Level

Knowledge

Public

Personnel of contractors and engineering firms involved in the design phases of projects

Objectives

Attendees will be able to implement the following skills:

- List deliverables by study phase, for major disciplines
- Identify audit elements to ensure proper design and interface management
- Provide perennial elements to assess the consequences of a change, prior to its integration into the project

Pedagogical & technical resources

- Examples and diagrams from oil & gas projects, discussed in the form of exercises
- Mini-project offering practical applications for different engineering disciplines

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

UNDERSTANDING OF PROJECT ORGANIZATION — 0.5 day

Different types of project: size, Greenfield vs. brownfield projects.
Project structure. Main project phases. Design studies scheduling.
Overview of design studies, from pre-project to detailed engineering phase

ROLE OF ENGINEERING IN A PROJECT — 1 day

Scope of works (SOW) of the engineering activities and basis of design (BOD).
Roles of contractors and subcontractors.
Its missions: studies, procurement, construction, project management. Identification of deliverables by phases.

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Conduct of studies on a project. Document management/validation (engineering, customer, vendors, subcontractors).

MAIN DELIVERIES & DISCIPLINE TASKS — 2.5 days

Analysis of the study basis. Applicable codes and standards. Kick off meeting.
Identification of tasks and deliverables during the study phases until the start of the purchasing process.
Detailed review of deliverables for the different engineering disciplines: process, health, safety and environment, layout, piping, materials/corrosion, equipment, instrumentation and automation, civil engineering/structures - Naval architecture/weight control for offshore project.
Integration of supplier documents in the study process. Management of interfaces between the different disciplines.
Management of study subcontracting.

REVIEWS & OPTIMIZATION — 0.5 day

Most used review methods: HAZID, HAZOP. Design reviews, 3D model review.
Optimization: energy efficiency review. Value engineering.
Evaluation of alternatives and optimal decision-making.

KEYS TO SUCCESS — 0.5 day

Interfaces management, Coordination between engineering, procurement and construction activities.
Internal constraints of the engineering schedule: interfaces between disciplines, vendor input.
How to take into account the geopolitical environment of the project, the constraints of objectives and means.
Adequacy of the deadlines of completion to the context. Deliverables related to the critical path. Management Of Change (MOC).

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Training - Thermal Equipment

MATHER-EN-P | Face-to-face only | 4 days

This course provides in-depth knowledge of heat exchangers, furnaces and boilers installed in the Oil & Gas industry

Level
Knowledge

Public
Engineers, technical staff and supervisors involved in the technology and operation of thermal equipment

Objectives
Attendees will be able to implement the following skills:

- Describe heat exchange laws and identify key parameters impacting exchange coefficients and pressure drops
- Select a type of exchanger construction with full knowledge of the advantages and disadvantages
- Explain the impact of operating conditions on furnace and boiler performance
- Identify the optimization parameters of a combustion plant and explain the operation of the main control loops

Pedagogical & technical resources

- Study of main components of burners, tube coils and refractory
- Actual examples and applications from the refining, petrochemical and chemical industry
- Trainee participation is continuously encouraged through the use of case studies selected by the trainees themselves

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

THERMAL EQUIPMENT & HEAT TRANSFER — 0.5 day

Heat exchange conditions: convection coefficients, resistance caused by the walls and/or fouling. Overall heat

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transfer coefficient.
Heat transfer by radiation: parameters influencing heat transfer, type of fuel burned, tube temperature, fouling consequence.

HEAT EXCHANGERS TECHNOLOGY & SELECTION CRITERIA — 1 day

TEMA standard heat exchangers, selection criteria for different types of shell, front ends and rear ends, floating end construction.
Tubes: length, diameter and gage, pattern and pitch, tube-to-tube sheet connection.
Baffles and support plates: type of transversal baffles, baffles cut, spacing.
Thermal performance: fluid flow distribution, geometrical characteristics and technological constraints.
Other types of heat exchanger: tubular or plate type, air coolers and condensers. Maintenance and cleaning.

HEAT EXCHANGERS PERFORMANCE & MAINTENANCE — 0.75 day

Heat exchanger performance follow-up: influence of fouling.
Inspection of exchanger bundles. Hydraulic pressure test: case of U tube bundle and floating head heat exchangers.

FURNACES & BOILERS TECHNOLOGY — 1.25 days

Different types of furnaces and their features. Operating conditions.
Boiler technology and operating conditions.
Efficiency of heat recovery: estimation rule. Parameters influencing heater efficiency.
Construction of heat exchange areas and refractory materials.
Air and flue gas circulation: natural and forced draft.
Burner technology: fuel and air supply and mixture. Low NOx and ultra-low NOx burners technology.

HEATERS OPERATION — 0.5 day

On stream operation: monitoring of combustion and heating. Modifying operating conditions.
Control system: air/fuel ratio control, process fluid outlet temperature, steam pressure, feed water flow rate control, phenomena disrupting the steam drum level. Safety prescriptions on heaters, process fluid, combustion, fuel circuits.
Safe and reliable operation: main recommendations. Start-up and shutdown: preparation, safe ignition procedures.

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Training - Site Emergency Management

MEMIR-EN-P | Face-to-face only | 3 days

This course provides personnel with formal training in command, control, communications and stress-related factors in the management of major emergencies

Level

Knowledge

Public

Personnel designated as being in charge of, are members of, or provide support to an emergency management team

Objectives

Attendees will be able to implement the following skills:

- Identify the key factors associated with maintaining control throughout the development or escalation of an emergency situation
- Describe how to manage communication, emergency-related information and put into place predetermined plans during emergency situations

Pedagogical & technical resources

- Several applications and illustrations
- On site exercise

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

WHAT IS A MAJOR EMERGENCY — 0.25 day

Local safety regulations.
Company rules.
Hazard study: escalation, consequences.
Emergency Response Plan (ERP).
Organization.
Resources required to face emergencies.

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External parties:

- Headquarters.
- Authorities.
- Neighbors.
- Other companies.

EMERGENCY RESPONSE PLAN — 0.5 day

Typical content.
Analysis of Emergency Response Plan.
How to use it?
Why is it an essential document?
Which parts are essential?

EMERGENCY RESPONSE TEAM — 0.25 day

General organization.
Functions and responsibilities of ERT members.
Competencies and training.
To be permanently ready to face accidents: functions and roles, ERP, CRR and its equipment.
Frequency of drills.

EMERGENCY RESPONSE MANAGER — 0.25 day

Function and responsibilities.
Competencies and training.
How to manage a team in emergencies situations:

- Difference between normal and emergency management.
- Leadership.
- Uncertainty.
- Importance of decision making.
- Stress: managing self and team stress.

CRISIS RESPONSE ROOM — 0.25 day

Equipment:

- Communication means.
- Recording means.
- Plans and technical data.

Ergonomics.

EMERGENCIES SPECIFIC TOOLS & METHODS — 0.5 day

Time management: “time-out”.
How to communicate:

- With company staff.
- With authorities.
- With ERT.

Communication tools: radio, phone...
Analysis of initial situation:

- Evaluate quickly.
- Anticipate.

Specific tools:

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- Reflex sheets.
- Guide sheets.
- Checklists.

How to record events, decisions and actions.

EXERCISE — 1 day

Based on one of the ERP scenarios.

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Training - Day-to-Day Energy Optimization for Industrial Plants

MENERG-EN-P | Face-to-face only | 4 days

This course aims to optimize energy consumption and operational costs by improving operation of thermal equipment and steam network balance

Level
Skilled

Public
Operation, technical staff & supervisors involved in the technology and operation of thermal equipment, and interested in energy consumption optimization of the plant

Objectives
Attendees will be able to implement the following skills:

- Identify opportunities to improve energy balances on an industrial site
- Define operating conditions and means of adjustment to optimize combustion in furnaces and boilers
- Identify key points in the production and economic use of steam and electricity in factories

Pedagogical & technical resources

- Practical course and case studies based on industrial feedbacks
- Numerous exercises to improve understandings

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENERGY BALANCE - EFFICIENCY & CONTEXT — 0.25 day

KPI's definition (Key Performance Indicators): energy intensity and efficiency, units and use.
Motivations and constraints: energy dependence and regulation.
Different approaches for energy efficiency: operation improvement, operating conditions optimization, significant improvement solutions, Best Available Techniques (BAT).

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ENERGY CONSUMPTION INSIDE FURNACES & BOILERS — 0.75 day

Main type of furnaces and boilers. Operating conditions.
Heat balance, efficiency estimate. Scope and limitations to improve efficiency.
Material and equipment used to improve efficiency and heat recovery.
Applications and exercises:

- Heater efficiency estimate and flue gas composition calculation.
- Boiler operating conditions analysis - Heat recovery in radiant and convection zone.
- Impact of fuel composition on atmospheric emissions.

ELECTRICITY & STEAM PRODUCTION — 1.25 days

Cogeneration cycles: boiler-steam turbine, gas turbine-waste heat boiler.
Operating conditions (extraction or discharge pressure, single recovery or post-combustion waste heat boiler's operation) and thermal performance.
Steam network operation and balance. Mechanical energy produced by steam expansion, energy recovery and electricity production optimization.
Sources of margin: technology and use of steam traps.
Application:

- Study of a power plant.
- Estimation of production cost for steam (HP, MP, LP) and electricity.

HEAT & MECHANICAL ENERGY RECOVERY — 1.25 days

Scope and limitations of heat recovery inside heat exchangers. Parameters impacting heat flux and heat transfer.
Sources of margin: heat exchangers performance follow-up, impact of fouling, cleaning strategy and optimum cleaning frequency calculation.
Low temperature heat recovery: heat pumps solutions or mechanical compression of gases (main operating constraints).
Mechanical energy recovery inside process-gas turbines.
Application:

- Heat exchanger train performance follow-up.
- Optimum cleaning frequency calculation.

PROCESS OPERATION — 0.5 day

Limitation of losses: mechanical (operating conditions) and thermal (insulation).
Ways to reduce energy consumption by adjusting operating conditions (pressure, recycle gas flowrate...), thermal integration.
Applications:

- Study of different flow control system on compressor.
- Impact of a distillation column operating parameters on energy consumption.
- Impact of a lack of thermal insulation.

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Training - Metering and Allocation

METER-EN-P | Face-to-face only | 5 days

This course provides a comprehensive knowledge of metering equipment and applications in the Oil & Gas industry

Level
Skilled

Public
Operational staff of Oil & Gas field treatment plants and terminals, instrumentation specialists, petroleum architects, project engineers, reservoir engineers, well performance specialists, completion specialists, personnel from engineering companies and all professionals interested in metering methods and equipment used in the petroleum industry

Objectives
Attendees will be able to implement the following skills:

- Review different kinds of metering and allocation methods and assess importance of accuracy
- Grasp technology and operating principles of single-phase metering equipment
- Understand standards of liquids and gases transactional metering
- Assess operation, maintenance and calibration techniques of metering installations
- Review multiphase metering advantages, technology and operating principles

Pedagogical & technical resources

- Applications and illustrations from the industry
- Site visit according to possibility

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

DIFFERENT TYPES OF METERING - IMPORTANCE OF METERING — 0.5 day

Types of metering: technical, transactional, allocation, fiscal.
Importance of metering accuracy.

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DATA PROCESSING 0.5 day

Technical material balances, data reconciliation, data architecture, architecture of DCS, data recording.

IMPLEMENTATION OF A METERING INSTALLATION - INFLUENCE ON PROCESS 0.5 day

Friction losses, introduction of a cold spot, intrusivity, leakage risks...

SINGLE-PHASE METERING: OPERATING PRINCIPLE & EQUIPMENT 1 day

Fluids dynamics.
Different types of single-phase meters:

- Meters based on kinetic energy (ρV^2): orifice plate meters, pitot tubes, rotameters.
- Meters based on velocity: direct meters (turbines, volumetric meters) or indirect meters (ultrasounds, electromagnetic, vortex, thermal, turbines).
- Derived meters: use of centrifugal pump characteristic curve, use of rotation speed of a positive displacement pump...
- Tracers: chemical, radioactive, inter-correlation.

TRANSACTIONAL METERING OF LIQUIDS 0.5 day

Static transactional metering or pseudo-transactional metering...
Metering bench; turbines, volumetric, ultrasounds.
Calibration of metering installations on test bench in manufacturing facilities or on site.
Operation of metering installations: maintenance, calibration.
Calculators: corrections, conversion into standard volumes.
Sampling, online analysis and lab analysis.

TRANSACTIONAL METERING OF GASES 0.5 day

Metering bench; turbines, volumetric, ultrasounds.
Calibration of metering installations on test bench in manufacturing facilities or on site.
Operation of metering installations: maintenance, calibration.
Calculators: corrections, conversion into standard volumes.
Sampling, online analysis and lab analysis.

MULTIPHASE METERING: OPERATING PRINCIPLE & EQUIPMENT 1 day

Advantages of multiphase metering.
Fluids: flow modes, composition.
Principle of multiphase measurement: gamma-metric measurement, volume measurement, passive noise analysis use of dielectric, of Venturi, of inter-correlation.
Use of optic fibers: inter-correlation, sound velocity.
Description of some equipment available for multiphase measurement: 3D, Roxar, Agar, Haimo, MPM, Weatherford.
Installation of multiphase measurement - Impact on process: fluid conditioning, intrusiveness.
Subsea and downhole multiphase meters.
Calibration at manufacturer facilities.
Operation and maintenance of multiphase meters.

ALTERNATIVES TO THE USE OF MULTIPHASE METERS 0.5 day

4D seismic. Use of natural or introduced tracers.
Estimation of the contribution of each reservoir.

Sessions

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Pau - From 09/21/2026 to 09/25/2026 **4730 €/HT**

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Training - Machine Learning Concepts

MLBASIC-EN-D | **Distance only** | **3 days**

Machine learning is a subfield of Artificial Intelligence that acts as a bridge between Data Science and Artificial Intelligence. Its objective is to understand the structure of data and to build data-driven models for further automate decision-making processes, in most technical domains including the O&G industry

Level

Awareness

Public

The course is intended for O&G professionals interested in machine learning and its applications to O&G

Objectives

Attendees will be able to implement the following skills:

- describe the different types of machine learning, algorithms, techniques and models
- identify the main programming languages used in machine learning
- examine some machine learning applications in the O&G industry

Pedagogical & technical resources

Interactive lectures and exercises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO MACHINE LEARNING

MACHINE LEARNING METHODS

Supervised machine learning.
Unsupervised machine learning.

COMMON ALGORITHMIC APPROACHES

Decision tree, K nearest neighbors, deep learning.

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PROGRAMMING LANGUAGES

Python, Java, R, C++.

EVALUATING MACHINE LEARNING MODELS

Quantify errors; testing and validation.

EXAMPLES OF MACHINE LEARNING APPLICATIONS IN O&G

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Training - Introduction to Data Analytics and Machine Learning Techniques for Geosciences and Reservoir Engineering

MLRES-EN-P | **Face-to-face only** | **3 days**

This course provides an extensive and practical knowledge for applying data analytics in reservoir modeling and predicting the well performance; the data driven approach is used to understand the main factors affecting the reservoir performance, using the fuzzy logic to rank these parameters and build a predictive model to optimize the reservoir response. Emphasis will be put on the use of supervised and unsupervised neural networks algorithms

Level

Awareness

Public

Reservoir engineers and geoscientist interested in data analytics, data driven reservoir modeling and machine learning methods for predicting reservoir performance

Objectives

Attendees will be able to implement the following skills:

- Apply the basic statistical methods for better data analysis
- Apply clustering methods for data classification (facies logs modeling)
- Build a predictive model using available machine learning methods and use it as a proxy model for predictions, uncertainty analysis and quantification

Pedagogical & technical resources

Interactive lectures and exercises

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION TO DATA ANALYTICS — 0.5 day

Principles of data analytics.
Data statistics (univariate, bivariate, distributions).

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Data ranking (correlation matrix, principal component analysis, fuzzy logic).

MACHINE LEARNING TECHNIQUES — 1 day

Fundamentals of machine learning (supervised and unsupervised).
Evaluating machine learning models.
Machine learning workflow.

PREDICTIVE MODEL & UNCERTAINTY QUANTIFICATION — 1.5 days

Build a predictive model using machine learning techniques.
Predictive model, quantify errors, testing and validation.
Examples for predictive model in reservoir engineering.

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Training - Text Analysis using Machine Learning

MLTXT-EN-D | **Distance only** | **1 day**

In the Oil & Gas industry, like in other domains, most of the engineering knowledge and experience is saved in unstructured documents such as PDF files, MS Office files or just scans of paper reports. Extracting information from this file required a tremendous effort from domain experts and data officers since deterministic data mining tools have limited capabilities Today some new machine learning systems proposes some new ways to extract more information from unstructured documents. This course will review the more common used algorithms in the domain of text analysis and is a good introduction to the domain of machine learning

Level

Awareness

Public

Geoscientists who have to use machine learning and/or text analysis tools to reach their business objectives (Boot camp training with a notebook designed for people having no or limited python experience, but with general knowledge of coding)

Objectives

Attendees will be able to implement the following skills:

- Understand the main algorithms used for text mining and text analysis, and run a text classifier using a Colab notebook

Pedagogical & technical resources

This course can be delivered as a presential or virtual classroom. Each training module contains lectures, hands-on practices and/or case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION

Problem statement.

TEXT CLASSIFICATION USING A ML ALGORITHM IN A NOTEBOOK

Exploring the document with EDA.

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Features engineering using the scikit-learn library.
Model training:

- Logistic regression.
- Passive aggressive classifier.
- Random forest classifier.
- Gradient boosting classifier.

Model validation:

- Precision, recall, F1 score.
- Confusion matrix.
- Lime, ELI5.

NATURAL SPEECH PROCESSING

Semantic analysis.
Markow chains.
Sentiment analysis.

DETECTING KEY-WORDS/METADATA VALUES IN TEXT

Detecting candidate values with deterministic method.
ML to associate a confidence factor to each candidate.
Improving the model thanks to the user experience.

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Training - Oil Markets and Trading

MTP-EN-P | Face-to-face only | 3 days

This training provides a better understanding of the structure of the markets, the uses and the impacts of physical and financial markets for crude oil and petroleum products

Level
Skilled

Public
All personnel in the petroleum or associated industries needing to improve their knowledge and understanding of crude oil and petroleum products trading and pricing mechanisms

Objectives
Attendees will be able to implement the following skills:

- Analyze the parameters which influence prices of crude oil and prices of petroleum products and the ways of evaluating price risk
- Review the different oil trading markets by type of transaction and diffrenciate the different derivatives
- Comprehend hedging techniques available for protection against fluctuations in prices while understanding the importance of maritime transport costs in oil supply economics

Pedagogical & technical resources

- Syndicate works on case studies
- Case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OIL MARKETS FUNDAMENTALS — 0.25 day

Energy resources, demand and supply.
Oil producing and consuming countries, OPEC, international oil companies: constraints and strategies.
General features of trading and shipping : freight rate, worldscale, chartering contracts

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CRUDE & PETROLEUM PRODUCTS PHYSICAL TRADING — 1 day

What is the value of a crude oil? The refiner's point of view.
Different types of contracts: long term, spot and forward.
Main oil markets and their features.
Key benchmark crudes.
The role of the PRAs (price reporting agencies).
Links between Trading and Shipping.
Products trading.
Main provisions of a sale/purchase contract.

EXCHANGES & FUTURES TRADING — 1 day

The concept of volatility
Definition of a contract: the cases of WTI and Brent.
Exchanges and their organization: the cases of NYMEX and ICE.
Main Futures Markets.
Hedging principles: for a refiner, a producer, a marketer, a consumer
Hedging imperfections, basis risk.
Market structure (contango, backwardation).
Case studies.

DERIVATIVES & RISK MANAGEMENT — 0.75 day

Options: principles, basics and characteristics.
Interests and limits of options.
Swaps: principles, basics and characteristics.
Interests and limits of swaps
Clearing OTC transactions.
Options: pricing and sensitivities.
Options strategies: caps, floors, collars.
How to account for the risk: Mark to Market and Value-At-Risk

Sessions

Rueil-Malmaison - From 10/19/2026 to 10/21/2026 — **2890 €/HT**

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Training - Non-Destructive Testing for Petrochemical Industries

NDTIW-EN-P

Face-to-face only

5 days

This course explains basic and advanced non-destructive testing methods used in the Oil & Gas industry as well as the chemical industry

Level

Knowledge

Public

Experienced operation and maintenance engineers, managers and technicians involved in the technical aspects of the Oil & Gas, refineries and chemical industries

Objectives

Attendees will be able to implement the following skills:

- Identify available non-destructive examination methods
- Select effective non-destructive examination methods based on the type of degradation, equipment and material
- Evaluate external on stream NDT and internal NDT during plant shutdown
- Understand maintenance work linked to NDT applications

Pedagogical & technical resources

- Case studies to identify capabilities and limitations of each NDT
- Practical demonstration of non-destructive examination in a workshop

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BASIC & ADVANCED NDT TECHNIQUES — 2 days

Visual test, Liquid Penetrant test (PT), Magnetic Test (MT), Radiographic Test (RT), Ultrasonic Testing (UT, TOFD, Phased Array, IRIS), Leak Testing (LT), Electromagnetic testing (ET), Positive Material Identification (PMI), Infrared Thermography (IR), Hardness, Acoustic Emission, Magnetic Flux Leakage.

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For each technique, study:

- The basic physical principles.
- The type of degradation to be detected.
- The limitations and exclusions.
- The pros and cons compared to other NDT.
- Safety and health features.

NDT certification according to ISO and ASNT. Dates of expiration and re-issue.

PRACTICAL APPLICATION — 3 days

Visual:

- Identify local or generalized corrosion, read color and aspect of rust/corrosion compound to obtain preliminary clues about the degradation type.
- Select appropriate light intensity.

Penetrant test and magnetic test:

- Surface preparation methods, different types of penetrants and developers.
- Observation of the cracks.

Thickness UT, shear wave, TOFD:

- Surface preparation, types of probes.
- Analysis of the various signals.

Radiography - X rays and gamma rays:

- Understand the relationship between energy and time exposure.
- Review safety issues during field or shop choosing.
- Read radiographic films to analyze remaining thickness and cracks.
- Discover new developments such as digital radiography.

IR thermography: after appropriate tuning, manipulate the camera to see hot spots.
Hardness:

- Practice Brinell, Rockwell or Vickers methods; compare results for carbon steel and stainless steel.
- Practice test on base metal, heat affected zone, and weld and infer the tensile strength.

PMI: practice the method on different metallurgies.

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Training - Energy Transition Engineer

NRJENG-EN-P | Face-to-face only | 60 days

This course aims to provide the in-depth technical knowledge of energy transition necessary to hold rapidly, and very effectively, the position of field operations engineer or project engineer

IFP Training Certificate

Graduate Certificate

Level

Skilled

Public

Engineers (particularly recently graduated operation, design or project engineers) interested in a specialization in energy transition

Objectives

Attendees will be able to implement the following skills:

- Grasp fundamentals of energy production in the context of energy transition
- Explain fundamental concepts underlying electricity production
- Analyze operating conditions and basic design of processes
- Describe the technology of static equipment and rotating machinery used in production facilities
- Identify main risks related to projects, including economics and societal
- Contribute to the dynamics of projects studies

Pedagogical & technical resources

- Highly interactive training with industry specialist lecturers
- Numerous applications and illustrations
- Multiple teamwork sessions. Use of dynamic simulations and industrial case studies
- Numerous simulations performed using the PRO/II™ or HYSYS™ or UNISIM™ software
- Several tutorials with equipment in a workshop. Site/field visits

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including a presentation in front of a jury

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

ENERGY PRODUCTION & MANAGEMENT IN THE CONTEXT OF ENERGY TRANSITION — 5 days

Energetic worldwide context - Low carbon energy production.

NATURAL & BIOGAS PROCESSING — 10 days

Thermodynamics applied to hydrocarbons processing.
Gas processing.
Process design case studies using process simulation software.

TECHNOLOGY OF PRODUCTION FACILITIES & PROCESS EFFICIENCY — 10 days

Piping systems and process equipment, metallurgy, corrosion management.
Electrical systems, instrumentation, process control and safety instrumented systems.
Energy optimization and heat exchangers network.

ELECTRICITY PRODUCTION — 10 days

Gas turbines.
Power generator.
Offshore wind challenges.

ECONOMICS & PROJECT MANAGEMENT — 10 days

Fundamentals of contracts - Project profitability evaluation - Risk analysis of energy transition projects.
Project cost estimation and control.
Cost of energy: conventional and renewables (biogas, solar, wind), LCOE, grid parity...

PROCESS SAFETY MANAGEMENT — 5 days

Process hazard analysis: HAZID, HAZOP, plant layout...
Operating procedures, mechanical integrity, organizational elements.

SOCIAL & ENVIRONMENTAL IMPACT MANAGEMENT — 5 days

Societal consequences and problem linked to new energies development.
Communication challenges and constraints, managing the relationships with partners.

BIOGAS DEVELOPMENT PROJECT — 5 days

Teamwork on a biogas project using actual data.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Operation, Maintenance and Inspection of Rotating Machinery

OMIRM-EN-P | **Face-to-face only** | **10 days**

This course provides key competencies related to rotating machinery operation and maintenance tasks

Level

Skilled

Public

Engineers, supervisors and technical staff involved in rotating machinery maintenance and technical inspection

Objectives

Attendees will be able to implement the following skills:

- Explain how to operate rotating machinery (pumps, compressors, steam turbines)
- Explain the key points for fluid flow and gas compression/expansion theory and practical applications
- List the key points for rotating machinery maintenance and inspection operations
- Explain how to achieve these operations
- List the main failure modes related to each here above listed rotating machinery
- Participate in the machinery reliability improvement process

Pedagogical & technical resources

- Interactive lecture
- Case studies based on industrial and actual feedback
- Practical work in workshops on actual equipment
- Use of dynamic simulators: pumps, compressors, steam turbines

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CENTRIFUGAL PUMPS — 2 days

Main parts: casing, rotor, mechanical seals, bearings, coupling, auxiliary systems.
Fluid flow key points with a pumping system.
Operation: performance curves, flow control, start-up and shutdown, general troubleshooting.
Maintenance: assembly and dismantling procedures, main checks.
Typical defaults and failure modes.

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RECIPROCATING & CENTRIFUGAL COMPRESSORS — 2 days

Main parts: casing, crankshaft/rotor, packings/mechanical seals, bearings, coupling, auxiliary systems.
Gas compression key points. Single and multistage compression.
Operation: performance curves, flow control, start-up and shutdown, monitoring, protection curves, general troubleshooting.
Maintenance: assembly and dismantling procedures, main checks.
Typical defaults and failure modes.

TURBINES & EXPANDERS — 1 day

Various types of turbines: steam and gas turbines, expanders. Typical applications.
Main parts: casing, rotor, seals, governors, bearings, coupling, auxiliary systems.
Gas and steam expansion: key points.
Operation: performance curves, speed and power control, start-up and shutdown, monitoring, overspeed protection, general troubleshooting.
Maintenance: assembly and dismantling procedures, main checks.
Typical defaults and failure modes.

LUBRICATION SYSTEMS MAINTENANCE/OIL ANALYSIS — 0.5 day

Purpose, different types of lubricants and lube systems.
Lubrication equipment maintenance: key points.
Oil analysis. Reports. Case studies.

BEARINGS MAINTENANCE — 1 day

Antifriction bearings: clearances/interferences assessments and checks, assembly procedures.
Sleeve and tilt pad journal and thrust bearings:

- Shaft rotation in an oil bearing.
- Clearances checks.
- Instrumentation checks and fitting procedures.
- Case studies.

COUPLINGS & ALIGNMENT — 0.5 day

Different types of couplings and related problems.
Various alignment methods, tolerances.

ROTORS & SHAFTS — 0.5 day

Balancing: API/ISO definitions, tolerances. Balancing methods.
Geometrical shaft checks.

RUPTURE MODES — 1 day

Rupture mechanisms.
Surface damage
Fatigue, wear and tear. Rupture face analysis.
Case studies.

USE OF VIBRATION ANALYSIS — 1.5 days

Different types of measurements and sensors.
Typology of typical defaults affecting rotating machinery.
Spectrum analysis and various techniques for diagnosis.
Case studies.

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Training - Commissioning and Start-Up of Process Units

OPDEM-EN-P | Face-to-face only | 5 days

Prepare participants to manage commissioning and start-up operations

Level
Skilled

Public
Supervisors, engineers and technicians of oil/chemical companies or engineering, involved in the commissioning and start-up of new units

Objectives
Attendees will be able to implement the following skills:

- Present pre-commissioning, commissioning and start-up activities on a project from the perspective of their programming and management
- Specify the basis for supervising or delegating activities in a context of mastering the specific constraints related to these operations

Pedagogical & technical resources
Cases studies on the precommissioning, commissioning and start-up of typical units

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PROJECT BACKGROUND & COMMISSIONING PHASES — 2 days

Main phases of a project.
Engineering studies (FEED, Detail) and anticipation of commissioning activities.
Project contract type and impact on commissioning activities.
Integration of commissioning activities into the project process: mechanical completion, pre-commissioning, commissioning and start-up activities during the project steps.

ORGANIZATION — 1 day

Commissioning procedures. Interfaces with the different engineering disciplines according to the types of

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contract.
Plant/project breakdown into systems and subsystems. Execution plan for commissioning and start-up. Setting up of commissioning/start-up teams. Split of responsibilities. Preparation of the list of precedents. Start-up phases: pre-commissioning, commissioning and preparation for start-up, performance tests, provisional acceptance, mechanical guarantees, final acceptance. Hand over.

SAFETY — 0.25 day

Risks related to the auxiliary fluids and the introduction of hydrocarbons. Risk evolution between construction, commissioning and start-up. Control of the risks related to modifications during the different phases.
Pre-Start-up Safety Review (PSSR).

END OF CONSTRUCTION - PRECOMMISSIONING — 0.75 day

Precommissioning activities: static verification of equipment, hydraulic tests and equipment cleaning, involvement of operations in the mechanical completion, punch-list, actions follow-up and close out.

COMMISSIONING — 0.75 day

Commissioning activities. Cleaning, flushing, blowing and drying. Dynamic testing.
Synchronization of control loops and Programmable Logic Controller (PLC).

START-UP & ACCEPTANCE — 0.25 day

Start-up permit: checks required before oil-in. Leak tests, air removal, raw materials introduction.
Transition towards industrial production: performance tests, temporary and final acceptance, responsibility transfer.

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Training - Turnaround Organization and Optimization

OTAU-EN-P | **Face-to-face only** | **5 days**

This course provides an overall strategy to achieve the main turnaround objectives: safety, deadline and budget compliance

Level
Skilled

Public
Engineers and staff (from maintenance, purchasing, project organization, and operation) involved in turnaround management for refining or petrochemical plants

Objectives
Attendees will be able to implement the following skills:

- Identify the steps of a rigorous methodology in preparing shutdown work
- List the points to be taken into account in the establishment, monitoring and analysis of a shutdown schedule
- Specify organizational and supervisory elements that make shutdown work effective
- Explain basic safety rules to be followed during shutdown work

Pedagogical & technical resources

- Numerous applications and cases studies
- An interactive delivery method that draws on participants' experiences
- Trainees mini-projects based on a standard plant

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TURNAROUND REQUIREMENTS — 1 day

Turnaround justification: local regulation, maintenance, projects, plant availability.
Turnaround frequency and objectives: schedule, safety compliance, duration and cost.
Typical data used for a turnaround: economic incentives, scope definition.

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Steering committee, organization and Key Performance Indicators. Financial breakdown and cost estimate.

TURNAROUND PREPARATION — 2 days

Detailed scope, work-list analysis.
Work preparation: tasks sequencing, procedures, long-term material and spare parts orders.
Critical operation identification and preparation.
Cost estimation.
Scheduling: overview, detailed planning and milestones.
Safety plan - Logistics.
Scope challenge: internal and external review.
Team building techniques.
Contracting policy: clear understanding of the different types of contracts: lump sum, reimbursable, unit rates.
Purchasing plan.
Contracting procedure.

SUPERVISION OF TURNAROUND ACTIVITIES — 2 days

Planning and quality control.
Cost control activities during works.
Management of changes and contingencies.
Mechanical completion, commissioning and start-up activities: acceptances certificates; organization.
Unplanned and additional works management.
Reporting and turnaround assessment.
Occupational health and safety. Lock-out/tag-out procedures.
Risks dealing with hot works, lifting, works at heights, scaffoldings, electrical, piping, high pressure cleaning, work in confined spaces.
Job safety analysis. Prevention plans and work permits: regulation, education, constraints. Responsibility of the personnel.

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Training - Rotating Machinery Vibration Analysis

PAVIB-EN-P | Face-to-face only | 4 days

This course assesses the cause and evolution of mechanical failures by analysis of vibration signals It emphasizes the implementation of an efficient predictive maintenance program

Level
Skilled

Public
Engineers, supervisors and technicians involved in the technical inspection and maintenance of rotating equipment

Objectives
Attendees will be able to implement the following skills:

- Identify the signals to be searched for a given mechanical fault and how to visualize them
- Implement devices to show characteristic images
- Identify vibration images representing a number of typical mechanical defects
- Implement a maintenance plan for each machine based on the criticality

Pedagogical & technical resources

- Study of industrial cases
- Various illustrations of actual systems
- Use a professional measurement tools & software and/or test benches
- The practical approach makes the course suitable for full-time vibration specialists

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BASIC DEFINITIONS - OVERALL MEASUREMENTS — 0.75 day

Frequency and amplitude. Displacement, velocity, acceleration.
Different types of vibration: periodic, random, shocks.
Overall measurements: limitations, severity charts, high frequency techniques for anti-friction bearings, practical recommendations.

RESONANCE — 0.5 day

Simple system behavior: amplitude and phase. Actual rotor and bearings systems. Critical speeds.

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Using phase to study resonance. Identifying and solving problems.

TOOLS FOR DIAGNOSIS — 0.5 day

FFT analyzers: Fourier transforms and actual plots. Accelerometers, fixation methods.
Selecting analysis parameters: scales, units, windows. Using special functions: zoom, cepstrum, envelope detection.
Using non-contacting probes for monitoring large machinery running on plain or tilt-pad bearings.

MACHINERY DEFECTS & VIBRATION SIGNATURE — 2 days

Unbalance. Shaft and coupling misalignment.
Antifriction bearings - Typical defects.
Plain or tilt pad bearings instabilities.
Mechanical looseness, cracks, friction between rotor and static parts. Gear failures.
Electromagnetic defects of induction electric motors.
Drive belt vibration.

PRACTICAL MACHINERY VIBRATION MONITORING — 0.25 day

Vibration control policy: machinery improvement program. Different policies according to the type of machinery and its criticality.
Developing an effective program.

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Training - Basics in Fluid Flow - E-Learning

PC1E-EN-E | E-Learning | 2 hours

This e-learning module provides basic information on fluid flow basics These modules are integrated into some of our Blended Learning courses but can also be followed independently For any information please contact us at the following address: contact@ifptraining.com

Level

Skilled

Public

All professionals, interested in pump design, operation, maintenance, troubleshooting

Objectives

Attendees will be able to implement the following skills:

- list the main principles to keep in mind regarding fluid flow

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FLUID FLOW FOR PUMPS

Energy units, friction losses calculation, system curve assessment, operating point control with system curve control.

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Training - Basics in Centrifugal Pump Technology - E-Learning

PC2E-EN-E | E-Learning | 2 hours

This e-learning module provides basic information on centrifugal pump technology These modules are integrated into some of our Blended Learning courses but can also be followed independently For any information please contact us at the following address: contact@ifptraining.com

Level

Skilled

Public

All professionals, interested in pump design, operation, maintenance, troubleshooting

Objectives

Attendees will be able to implement the following skills:

- specify the main parts of a centrifugal pump

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CENTRIFUGAL PUMP TECHNOLOGY

Single stage centrifugal pump presentation, multistage centrifugal pump presentation.

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Training - Centrifugal Pumps and Positive Displacement Pumps

PC-EN-B | Blended-Learning | 4 days

This course covers the centrifugal and positive displacement pumps technology and their operating conditions

Level

Expert

Public

Engineers and technicians involved in centrifugal and positive displacement pump operation, maintenance or engineering

Objectives

Attendees will be able to implement the following skills:

- Explain the operation and operation of centrifugal pumps and technical solutions
- Identify potential incidents on these machines
- Pre-select and size a centrifugal pump

Pedagogical & technical resources

- Actual examples from the refining, petrochemical and chemical industry
- Active participation is encouraged through case studies
- Use of a centrifugal pump dynamic simulator
- E-learning session previously to the presential one

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

HYDRODYNAMICS APPLIED TO A PUMPING SYSTEM — 1.5 day

Pump performance:

- Flow in a pump, velocities triangle, internal flow and energy losses.

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- Theoretical and practical head: characteristic curve.
- Other characteristics: efficiency, power, NPSH required.
- Changes in characteristics vs. rotation, viscosity, impeller shape, cavitation.

Pipe system:

- System curve, resistance of flow and throttling control.
- Operating point: normal and maximum capacities, change in fluid characteristics and incidence on operating conditions.

Exercises with a dynamic simulator.

CENTRIFUGAL PUMP TECHNOLOGY AND SELECTION 1.5 day

Centrifugal pump:

- Impeller and pump shape, suction operating conditions.

Mechanical seal:

- Selection according to API 682 standard and type.
- Friction face heating.
- Safety and environment: typical arrangements (single, dual, dry seal).
- Specific solutions: canned motor pump, magnetic drive pump.

Installation:

- Suction and discharge pipe design.
- NPSH available; base plate and grouting.
- Ancillary lines and equipment.
- Coupling and driven machines.
- Safety and environment.

POSITIVE DISPLACEMENT PUMP TECHNOLOGY & PERFORMANCE 0.5 day

Technology: different types of pumps (rotary and reciprocating pumps). Operation and performance of the different types of pumps.
Influence of clearance, internal leaks, nature of product on flow rate and pressure. Flow rate control.
Installation guidelines: position of tanks, line diameters, metering drums, pulsation dampeners, pressure valves.

PUMP OPERATION 0.5 day

Preparation: filling and draining. Start-up/shutdown: priming, hammer shock, risks to the process and the pump.
Monitoring parameters (vibration levels, noises, bearing housing temperature, motor intensity, pressures).
Parallel and serial operation. Safety conditions.
Reliability: types and source of failures (wear, ruptures, cavitation, leakages); improvement methods.
Exercises with dynamic simulator.

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Training - Centrifugal Pumps and Positive Displacement Pumps

Applications with CORYS dynamic simulator

PC-EN-P | Face-to-face only | 4 days

This course covers the centrifugal and positive displacement pumps technology and their operating conditions

Level

Expert

Public

Engineers and technicians involved in centrifugal and positive displacement pump operation, maintenance or engineering

Objectives

Attendees will be able to implement the following skills:

- Explain the operation and operation of centrifugal pumps and technical solutions
- Identify potential incidents on these machines
- Pre-select and size a centrifugal pump

Pedagogical & technical resources

- Actual examples from the refining, petrochemical and chemical industry
- Active participation is encouraged through case studies
- Use of a centrifugal pump dynamic simulator
- E-learning session previously to the presential one

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

HYDRODYNAMICS APPLIED TO A PUMPING SYSTEM — 1.5 days

Pump performance:

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- Flow in a pump, velocities triangle, internal flow and energy losses.
- Theoretical and practical head: characteristic curve.
- Other characteristics: efficiency, power, NPSH required.
- Changes in characteristics vs. rotation, viscosity, impeller shape, cavitation.

Pipe system:

- System curve, resistance of flow and throttling control.
- Operating point: normal and maximum capacities, change in fluid characteristics and incidence on operating conditions.

Exercises with a dynamic simulator.

CENTRIFUGAL PUMP TECHNOLOGY & SELECTION 1.5 days

Centrifugal pump:

- Impeller and pump shape, suction operating conditions.

Mechanical seal:

- Selection according to API 682 standard and type.
- Friction face heating.
- Safety and environment: typical arrangements (single, dual, dry seal).
- Specific solutions: canned motor pump, magnetic drive pump.

Installation:

- Suction and discharge pipe design.
- NPSH available; base plate and grouting.
- Ancillary lines and equipment.
- Coupling and driven machines.
- Safety and environment.

POSITIVE DISPLACEMENT PUMP TECHNOLOGY & PERFORMANCE 0.5 day

Technology: different types of pumps (rotary and reciprocating pumps). Operation and performance of the different types of pumps.
Influence of clearance, internal leaks, nature of product on flow rate and pressure. Flow rate control.
Installation guidelines: position of tanks, line diameters, metering drums, pulsation dampeners, pressure valves.

PUMP OPERATION 0.5 day

Preparation: filling and draining. Start-up/shutdown: priming, hammer shock, risks to the process and the pump.
Monitoring parameters (vibration levels, noises, bearing housing temperature, motor intensity, pressures).
Parallel and serial operation. Safety conditions.
Reliability: types and source of failures (wear, ruptures, cavitation, leakages); improvement methods.
Exercises with dynamic simulator.

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Training - E&P Project Control Tools

PCGB-EN-P | Face-to-face only | 5 days

This course provides a comprehensive understanding of the techniques used to control a project.

Level

Skilled

Public

Professionals who have already occupied a position within a project task force and need to understand the fundamental project control processes.

Objectives

Attendees will be able to implement the following skills:

- Specify scope and interfaces of the project control function
- Apply different methods and tools related to project control
- Identify areas of concern and propose a corrective action plan

Pedagogical & technical resources

- The course is illustrated by numerous examples taken from actual Exploration & Production projects
- A project case study is used stage-by-stage while constantly comparing the standpoints of the company and the contractor

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PROJECT CONTROL FRAMEWORK — 1 DAY

Project control process map. Project scope and execution strategy. Project control plan implementation.

SCHEDULE — 1.5 DAYS

Schedule planning and development. Progress and performance measurement. Assess schedule and resource performance.

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COSTS — 1.5 DAYS

Cost estimating and budgeting. Resource planning. Project cost accounting. Assess cost performance. Forecasting.

VALUE ANALYSIS & RISKS — 0.5 DAY

Value analysis and engineering.
Risk management. Assess risks factors.

PERFORMANCE ASSESSMENT & CHANGES — 0.5 DAY

Assess work process and productivity.
Report project performance assessment.
Change management.

Sessions

Rueil-Malmaison - From 10/05/2026 to 10/09/2026 **4360 €/HT**

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Training - Properties, Formulation, Transfer and Storage of Petroleum Products

PCTS-EN-P | **Face-to-face only** | **8 days**

From the properties of the finished products, this training provides a deeper knowledge on petroleum products formulation, storage and transfer between different sites

Level

Skilled

Public

- Operation staff (field operators, panel operators, supervisors...) in reception, blending, storage and shipping facilities in refineries and petrochemical plants
- Anyone involved in petroleum products transfer and storage management

Objectives

Attendees will be able to implement the following skills:

- List key characteristics of crude oils, cuts, bases and finished products
- Apply mixing and manufacturing rules for finished products
- Calculate operating parameters of gravity and pumping transfers
- Recognize equipment from atmospheric storage tanks
- Identify risks for safety, equipment and accounting in storage operations and develop measures appropriate to control such risks

Pedagogical & technical resources

- Usage of many pictures and video for equipment understanding. Field visit if possible to be organized
- Case studies based on industrial situations: products transfers, products formulations

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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PROPERTIES OF CRUDE OIL & PETROLEUM PRODUCTS — 2.75 days

Crude oils: main constituents, properties, initial fractionation in petroleum cuts.
Petroleum products:

- LPG, gasoline, jet fuel, Automotive Diesel Oil, heating oil, heavy fuel oils, bitumen.
- Main specifications, manufacturing constraints, storage and safety specificities.
- Evolution of product specifications.

Bases and alternative fuels: ethanol, ETBE and FAME.

MANUFACTURING OF PETROLEUM PRODUCTS — 1.25 days

Bases manufacturing from petroleum cuts: petroleum products manufacturing scheme, simplified process diagrams of refineries and petrochemical units.
Finished products manufacturing:

- Theory and process for blenders: on-line optimization manufacturing, additivation.
- Economic aspects (give-away, added profit).

TRANSFER & TRANSPORT OF PETROLEUM PRODUCTS — 1.75 days

Transfer by gravity: characteristics of gravity flow.
Transfer by pumping:

- Performance of centrifugal pumps, simplified technology and adaptation to pumping circuits.
- Operation of centrifugal pumps, start-up, shutdown, installation in series and parallel implementation.
- Operation and simplified technology of volumetric pumps.
- Operation of a transfer installation: practical and economic aspects, risks of vaporization, pressure surges, etc.
- Transfer of crude oil and petroleum products by ship.

Application: study of transfer from one tank to another.

STORAGE OF PETROLEUM PRODUCTS — 2.25 days

Storage equipment:

- Pressurized and refrigerated tanks, spheres, cylindrical tanks, cryogenic tanks, cavities; ancillary equipment: safety valves, hydraulic safety valves.
- Fixed roof tanks: different types, vents, justification and limits of vent valves.
- Floating screen tanks: special features, justification.
- Floating roof tanks: different types of roof and seals, supporting legs, rainwater drainage.
- Protection against fire risks.

Tank operation:

- Operational safety: risks of inflammation, static electricity, pyrophoric substances, emulsions, overflow, toxic products.
- Heating. Mixing.
- Measuring the quantities delivered, stored and shipped: manual and remote gauging, measuring the temperature locally and remotely, volumetric and dynamic meters, manual and automatic sampling.
- Usual operation of storage tanks including emptying, degassing and decommissioning.

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Training - Petroleum Refining and Petrochemicals

PETREF-EN-P | Face-to-face only | 85 days

This training aims at developing competencies in processes, equipment, operation, safety, and the economical aspects of petroleum refining and petrochemicals

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers entering the refining and petrochemical industries or professionals with limited industry experience wishing to broaden their knowledge

Objectives

Attendees will be able to implement the following skills:

- Understand the basics of refining techniques
- Analyze the performances of the processes concerned, and optimize them
- Select and design the main equipment of processing plants
- Comprehend the technology and operation of equipment
- Understand the main refining processes, their fundamental aspects and operation
- Recognize safety and environmental issues in operation of such units
- Explain economic industry issues

Pedagogical & technical resources

- Case studies and applications related to industrial situations
- Dynamic simulators (CORYS IndissPlus simulators): equipment simulators and generic process units simulators
- Project: design of a distillation column using PROII/PROVISION

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

PHYSICO-CHEMICAL PROPERTIES OF HYDROCARBONS & PETROLEUM CUTS — 5 days

Organic compounds, crude oil and petroleum products.
Quality control - Standard tests - Blending rules.

APPLIED THERMODYNAMICS — 5 days

Properties of pure substances.
Fluid properties: liquid-vapor equilibria of hydrocarbons mixtures, of non-ideal mixtures, of non-identified components.
K values from modern numerical methods.

DISTILLATION COURSE & PROJECT WITH PROII — 10 days

Classical industrial column design, short cut methods.
Operating parameters, optimization, process control parameters.
Internal equipment.
Practice of PROII/PROVISION, process simulation, simplified design of equipment, economic evaluation and optimization.

HEAT TRANSFER EQUIPMENT — 5 days

Heat transmission.
Heat exchangers: sizing and performances, operation.
Furnaces and boilers: performances, operating conditions, combustion, operation, safety.

FLUID FLOW - ROTATING MACHINERY — 10 days

Characteristics of liquid and gas simple phase flow; gas compression laws, expansion.
Technology and operation of pumps, compressors, steam turbines, gas turbines, electrical motors.

INSTRUMENTATION & PROCESS CONTROL — 5 days

Instrumentation, controllers, valves, control loops implementation.
PID tuning, monovariable control limits, multivariable control.

REFINING PROCESSES - PRINCIPLES & OPERATION — 20 days

Characteristics of feeds and products, principles of the processes used, operating and control parameters of the unit, analytical follow-up, typical incidents, concerning the following refining units:

- Atmospheric and vacuum distillation of crude oil, Catalytic reforming, isomerization, hydrotreatment, sweetening of light cuts and sulfur recovery.
- Conversion of heavy cuts and related units: visbreaking, coking, FCC, RFCC, distillate hydrocracking, residue hydrocracking.
- Base oil refining.

PETROCHEMICAL PROCESSES - PRINCIPLES & OPERATION PRODUCTION OF OLEFINS & AROMATICS — 12 days

Production of olefins and aromatics:

- Sources, outlets and main industrial uses of olefinic and aromatic intermediaries.
- Steam cracking and treatment of the cuts produced.
- Fluid catalytic cracking (FCC) and production of aromatics.
- Economics of petrochemicals.

Production of convenience polymers (PP, PE, PS, PVC, PET):

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- Nature and types of polymers.
- Implementation principles and techniques.

Production of syngas:

- Main processes: steam reforming, partial oxidation (POX).
- Valuation of synthesis gas: combined cycles.

SAFETY - UTILITIES - ENVIRONMENT IN OPERATION — 8 days

Process safety:

- Product and equipment related risks, safety in process operation.
- Hazard analysis in design and operation.

Utilities:

- Steam networks.
- Electricity generation and networks.
- Production and distribution networks for air, fire and cooling water; flare.

Environmental control:

- Air pollution sources, detection and technologies for reduction.
- Sources of aqueous pollution; wastewater treatment, regulation and controls.

PETROLEUM ECONOMICS — 5 days

Evolution of the demand for derived products, international oil markets.
Short-term refinery management.

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Training - Production of Base Chemicals and Commodity Polymers

PETRO-EN-B | Blended-Learning | 4 days

This course provides a technical information of the main processes used to produce olefins and aromatics along with a comprehensive information on polymers and polymerization processes, and technologies available mainly in the polyolefins field

Level

Knowledge

Public

- Professionals, in the oil or petrochemical industry, interested in olefins, aromatics and polymers processes
- Specifically for engineers and technical staff who are beginners in this industry, as well as subcontractors, traders, etc

Objectives

Attendees will be able to implement the following skills:

- Describe the origins and main uses of petrochemical bases: Ethylene, propylene, butadiene, benzene, para-xylene
- list the main units producing these 5 bases

Pedagogical & technical resources

- This course can be adapted for distance learning
- Detailed course material
- Pictures of main equipment and samples

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

E-LEARNING: HYDROCARBONS - DISTILLATION - CATALYSTS - POLYMERS

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MODULE 1 - HYDROCARBONS - TYPES & IMPURITIES

Composition of crude oils.
Hydrocarbon groups and composition of petroleum products.
Crude oil impurities.

MODULE 2 - DISTILLATION PROCESS

Flash of a hydrocarbon mixture.
Principles of continuous distillation.
Industrial features of the distillation process.

MODULE 3 - INTRODUCTION TO CATALYSTS

Catalytic action.
Industrial applications.
Catalytic reactors examples.

MODULE 4 - POLYMERS

Introduction to polymers.
Polyethylene.
Polypropylene.

CLASSROOM TRAINING (4 DAYS)

STEAMCRACKING & TREATMENT OF THE CUTS PRODUCED — 1.75 days

Steamcracking:

- Implementation of cracking reactions: furnaces, quench systems, primary separation.
- Yields, operating variables affecting the severity of treatment, influence of the feedstock nature.

Compression and purification of the cracked gases:

- Implementation of compression.
- H2S and CO2 removal by caustic washing.
- Gas drying by adsorption.
- Cooling: propylene and ethylene chilling cycles, cold box.

Separation and treatment of steam cracker effluents:

- Steamcracker effluent separation train, main characteristics and purifications of the cuts: selective hydrogenations of acetylene from the C2 cut, of propyne and propadiene from the C3 cut, removal of carbon monoxide.
- Treatments of the C4 cut: production of 1,3- butadiene, recovery of isobutene from raffinate, upgrading of 1-butene in raffinate 2...
- Upgrading of pyrolysis gasoline production of motor fuels, benzene and other aromatics recovery.
- Alternative olefins production.

PRODUCTION OF AROMATICS — 0.5 day

Analysis of the catalytic reforming process, implementation of the catalyst, yields, operating variables.
Associated processes: hydrodealkylation, isomerization...
Treatment of cuts produced in those transformation processes:

- Aromatics and non-aromatics separation processes: liquid-liquid extraction, extractive distillation.
- Aromatics separation processes: distillation, adsorption, crystallization, application to paraxylene.

Aromatic complex arrangement. Highlighting of the aromatic loop.

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CATALYTIC CRACKING FCC — 0.25 day

Analysis of FCC process: nature of the feedstock, implementation of the catalyst and principle of reactor and regenerator set.
Composition and treatment of cracked gases.
Modification of the process for maximization of light cuts C3 & C4 production.
FCC dedicated processes for maximizing the production of C3 and C4 light olefins.

ON PURPOSE PROPYLENE PROCESSES — 0.25 day

Technical-economic context.
Processes for metathesis, propane dehydrogenation (PDH), methanol to olefins (MTO and MTO-OCP) and methanol to propylene (MTP), light olefin cracking (LOC).
Comparison of technologies - Selection criteria.

POLYMER PRODUCTION - ASSOCIATED PROPERTIES — 0.5 day

Type of reaction and basic characteristics of polymer reactions: polyaddition, polycondensation, heat of reaction, activation mode, etc.
Different arrangements of monomer building blocks in polyaddition: atactic, syndiotactic or isotactic polymers; random; block; graft polymers and others.
Relationship between end uses implementation and main polymer properties. Impact on properties.
Main tests used to get polymer characterization: melt index, viscosity index, etc. Test signification, relationship with polymer structure.
Consequences regarding polymer implementation techniques (extrusion, injection, etc.).

POLYMERIZATION IMPLEMENTATION - MAIN COMMODITY PLASTIC PROCESSES — 0.75 day

Techniques implemented to produce polymers: solution, bulk, emulsion, suspension, gas phase techniques.
Advantages and drawbacks of those different techniques consequences on processes implementation.
Examples applied to main processes used to manufacture major thermoplastics: polyethylenes (PE), polypropylenes (PP), polystyrenes (PS) and polyvinylchloride (PVC).
Flow charts and principles of processes. Some common and average operating conditions.
Influence of operating parameters (temperatures, pressures, monomers ratio and proportion of any chemicals involved in the reaction) regarding the quality of polymer obtained.
Some pretreatments of polymers outside the reactor before the transformation step.

Sessions

Classe virtuelle - From 04/20/2026 to 04/23/2026 — **3790 €/HT**

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - H2S Removal and Sulfur Recovery Processes

PFCS-EN-P | **Face-to-face only** | **3 days**

This course provides a deeper understanding of the operation and the monitoring, including HSE considerations, of common processes for elimination of H2S and for sulfur recovery

Level

Skilled

Public

Engineers and supervisors involved in operating, troubleshooting, optimizing or revamping sour gas treatment and sulfur recovery facilities

Objectives

Attendees will be able to implement the following skills:

- Identify environmental issues related to sulphur impurities
- List operating parameters of sulphur treatment units
- Specify rules of conduct to optimize processes

Pedagogical & technical resources

- Use of a dynamic simulator for amine and Claus units to simulate operating conditions
- Parts of or the whole session customizable to a virtual remote classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OVERVIEW OF SULFUR REMOVAL & RECOVERY — 0.25 day

Amine washing and sulfur recovery units role in refineries.
Nature, origins and compositions of the streams to be treated, ammonia content.
Determination of the sulfur balance for a typical refinery.
Environmental aspects, treatment justification.

AMINE UNITS — 0.75 day

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Chemical reaction between amines and H2S.
Process flow sheet and equipment review: absorption, regeneration, pumps and filtration.
Process control: pressures, temperatures, amine solution optimization, steam flowrate to regenerator optimization.
Regeneration quality: objectives, follow-up methods, and performance impacts.
Troubleshooting: amine solution degradation, foaming, corrosion, washing quality follow-up.
Safety issues.
Application: what you can learn from your amine analysis (routine and detailed).

SULFUR RECOVERY UNITS — 1 day

Chemical reactions: required and undesired ones, thermodynamics and kinetics.
Process flow sheet: thermal stage, catalytic stage, sulfur recovery, tail gas incineration. Operating parameters and impact on sulfur yield.
Process control: H2S/SO2 ratio control, air flowrate optimization, tail gas analyzer, warming up techniques and temperature control at the converters.
Troubleshooting: hydrocarbons presence, sulfur behavior as per temperature, H2S degassing from sulfur product, safety.
Shutdown situations and consequences, safety issues, ISS.
Use of a dynamic simulator to illustrate the impact of parameter changes.

TAIL GAS CLEAN-UP PROCESSES — 0.75 day

Process flow schemes: sub-dewpoint Claus or amine route.
Operating parameters and impact on process and sulfur yields.
Influence of the H2S/SO2 ratio.
Sources of usual operation troubles for each process: improper regeneration, catalyst ageing...
Impact on the CLAUS unit optimization.

SOUR WATER STRIPPER OFF-GAS TREATMENT — 0.25 day

Sour water characteristics. Ammonia content. Ammonia conversion and NOx monitoring.
Principle, main equipment, operating parameters, water quality follow-up.

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Training - Process Engineering - Equipment Sizing

PIDE-EN-P | Face-to-face only | 5 days

This course provides an overview of Oil & Gas projects engineering studies, from conceptual design to detail drawing

Level
Skilled

Public
Process engineers

Objectives
Attendees will be able to implement the following skills:

- List the various aspects of project engineering to be applied in real cases
- Be able to work with PID schemes

Pedagogical & technical resources

- Lectures with exercises
- Project by team (2 or 3 students): conception of a PID scheme from a PFD
- Specific and detailed documentation, industrial examples

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PROJECT DEFINITION — 0.5 day

Definition of the different type of projects.
Planning, description of the different project steps.
Organization: task force or conventional.
Departments description and role: purchasing, cost control, planning, engineering, construction...
Relation between client and contractor: progress report, change order...

ENGINEERING DIAGRAMS (PID'S) — 2 days

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Process flow schemes: purpose, available information.
General rules for the PID's conception:

- PID's importance during the contract.
- Milestones: PID's review...
- Potential development, "clever PID's".

Study of the PID's by splitting them in elementary parts (each part is made of one or several equipment): fractionation column, furnace, reactors, compressors...; piping; regulation, instrumentation will be studied in each part.
Safety elements: safety valves, valve action per air failure.
Utilities, start-up and shutdown piping: steam/condensate networks, hot oil, drain systems.
Other auxiliary piping: off-spec., start-up and shutdown piping.

ENGINEERING RULES & STANDARDS — 2 days

Units and conversion factors.
Hydrocarbon properties.
Equipment design rules: rotating machines (compressors, pumps...); thermal equipment (furnaces, heat exchangers); storage tanks; pressure vessels.
Piping design as per the fluid inside: gas, subcooled liquid, boiling liquid...
Instrumentation: control valves, on-off valves, flow meters, indicators...

RELIEF SYSTEM DESIGN BASIS — 0.5 day

Definition of risks.
Flare stack and flare main header and sub-headers design.
Safety valves design.
Emergency shut down diagram.
Depressurization.

PROJECT (TREATED ALL ALONG THE COURSE)

Conception of a PID from a process flow scheme. Application of rules for sizing piping and pieces of equipment.

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Training - Risk Based Inspection (RBI)

PLINS-EN-P | Face-to-face only | 5 days

This course covers the necessary background for setting up RBI for static equipment

Level
Skilled

Public
Managers, experienced engineers and staff involved in inspection, maintenance and operation in the petroleum, petrochemical and chemical industries

Objectives
Attendees will be able to implement the following skills:

- identify the degradation modes following the analysis of a corrosion loop and implement compensatory measures
- valculate the criticality of pressure equipment
- establish an inspection plan for piping and containers in accordance with regulatory requirements

Pedagogical & technical resources
An interactive course based on actual case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS OF RISK BASED INSPECTION — 0.5 day

API 580 overview, concept, probability and consequence of failure, risk ranking.
API 580 methodology, benefits and limits, workforce and schedule necessary to perform RBI study.
API 581 scope, probability of failure based on management factor and statistical failure frequency.

QUANTITATIVE & SEMI-QUANTITATIVE RISK BASED INSPECTION APPROACH — 2 days

Corrosion loops based on process conditions.
Design data and inspection data identification.
Damage factors identification based on corrosion standards such as API 571.

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Calculate probability of failure based on damage factor - Quantitative approach using API581 workflow.
Calculate consequence of failure - Quantitative and semi-quantitative approach using API581 workflow.
Evaluate the overall risk on API matrix.
Define inspection strategy: mitigations actions or inspection scheduling extension.
Overview of available commercial software “RBEYE”.
Example of industrial RBI strategy implemented.
RBI semi quantitative approach based on simplified Excel spreadsheet.

APPLICATION OF THE RBI METHOD WITH MINI-PROJECTS CASE STUDIES 2.5 days

Application of API 581 RBI method using mini projects - Case studies as teamwork:

- Select the appropriate corrosion loops and pressure vessels.
- Identify the degradation.
- Apply API 581 workflow to define POF, COF and overall risk.
- Analyze the risk and propose: risk mitigation with more efficient NDT, adapt the inspection frequency.

Apply RBI semi quantitative approach based on simplified excel spreadsheet and compare the 2 methods.
Each group presents its RBI analysis and conclusion.

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Training - Positive HSE Culture

POSCULT-EN-P | Face-to-face only | 2 days

This course aims to integrate HSE in the decision making process of the participants

Level
Knowledge

Public
Anyone working in the Oil & Gas industry

Objectives
Attendees will be able to implement the following skills:

- Describe the positive safety culture features and apply them to their decision making process
- Contribute to build a positive HSE culture in the organization

Pedagogical & technical resources
Several case studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ELEMENTS OF POSITIVE HSE CULTURE — 1 day

What is HSE culture. HSE culture assessment.
Elements of positive HSE culture: informed, reporting, learning, flexible and just.
Case studies.
Characteristics of positive HSE culture vs. negative HSE culture.
Importance and barriers for communication.

HSE LEADERSHIP — 0.25 day

Elements defining HSE leadership in the organization.
Characteristics of HSE leaders.

HUMAN FACTORS & BEHAVIORS — 0.75 day

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Analysis of incidents. Underlying and root causes.
Human error. Modelisation of decision making process.
Analysis of behavior. Types of approaches to risk.
Observation of behavior. Participate in HSE observation visits.

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Training - Profitability Analysis of Downstream Investment Projects

PPA-EN-P | Face-to-face only | 3 days

This course provides a better understanding of the concepts underpinning the capital budgeting theory, helping improving the economic analysis of investment projects. A number of exercises and computer case studies will be treated all along the course to apply the theoretical principles that are presented, which makes the course a very practical one

Level

Skilled

Public

Staff involved in capital investment decisions. Project managers, engineers, commercial staff and support functions. Decision makers wishing to better understand analyses carried out by project teams

Objectives

Attendees will be able to implement the following skills:

- Develop a computer model for the economic evaluation of downstream projects
- Compute and analyze the key economic evaluation criteria (NPV, IRR...) on an ungeared and geared basis
- Include the risks and uncertainties of Downstream projects in their economic evaluation

Pedagogical & technical resources

- Exercises and case studies on Microsoft Excel including
- Quiz

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

VALUE CREATION & DISCOUNTING CASH FLOW METHODOLOGY — 0.5 day

Introduction.
Discounting principles: time value of money.
Value creation and cost of capital (WACC).

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INVESTMENT PROJECT GLOBAL PROFITABILITY ANALYSIS — 1.5 days

Constructing a project's cash flow schedule: profit and loss account vs. cash flows, dealing with taxes, working capital impact, and economic life.
Calculating and understating the key economic analysis criteria: Net Present Value (NPV), Internal Rate of Return (IRR), payback time, financial exposure, profitability index.
Considering monetary erosion: nominal and real term values concepts. Impact on projects' profitability.
Economic cost/breakeven.
Working with several currencies.
Economic indicators interpretation pitfalls.

INTRODUCTION TO RISK ANALYSIS — 0.3 day

Identifying risks and taking them into account in the economic analysis: Pestle analysis, risk premium, contingencies.
Sensitivities (Tornado chart, Spider diagram), scenarios, decision trees.

GEARED CASH FLOW ANALYSIS — 0.7 day

Project financing and equity returns: bankability criteria, leverage effect
Participants will be asked to work on various exercises and case studies along the course including:

- Calculating the WACC of a company
- Calculating the Impact of working capital on a polypropylene plant project.
- Profitability analysis of a Petrochemicals plant.
- Profitability analysis of a Bio refinery (ungeared and geared).

The list of exercises and case studies above may be adapted by IFP Training at the time of the course to best suit the participants' profile and learning objectives.

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Training - Commodity Polymers Manufacturing

PPLAS-EN-P | Face-to-face only | 3 days

This course provides a comprehensive information on polymers and polymerization processes used to produce polyethylenes, polypropylenes, polyvinylchloride and polystyrenes

Level

Knowledge

Public

Professionals interested in polymers production

Objectives

Attendees will be able to implement the following skills:

- Explain the principles of polymerization techniques and the main characteristics of manufactured polymers
- Describe the operating conditions of polymerization processes

Pedagogical & technical resources

- This course can be adapted for distance learning
- Presentation of polymer samples from the manufacturing plants
- Presentation of end uses application samples

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

POLYMER TYPES & NATURE — 0.25 day

Polymer constitution: monomers, macromolecules, building blocks.
Various kinds of polymer: fibers, elastomers, plastics.
Plastic types: thermoplastics and thermosets.
Main commodity polymers: polyethylenes, polypropylenes, polystyrenes and polyvinylchloride.
Economical aspects relating to these commodity polymers.

POLYMER PRODUCTION - ASSOCIATED PROPERTIES — 1 day

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Main polymerization reactions: polyaddition, polycondensation.
Basic characteristics of polymer reactions: heat of reaction, activation mode, etc.
Different arrangements of monomer building blocks in polyaddition: atactic, syndiotactic or isotactic polymers; random block; graft; alternate polymers.
Relationship between end uses implementation and main polymer properties. Impact on properties.
Main tests used to get polymer characterization: melt index, viscosity index, etc. Test signification, relationship with polymer structure.
Consequences regarding polymer implementation techniques (extrusion, injection, etc.).

POLYMERIZATION IMPLEMENTATION - MAIN COMMODITY PLASTIC PROCESSES — 1.75 days

Techniques implemented to produce polymers: solution, bulk, emulsion, suspension, gas phase techniques.
Advantages and drawbacks of those different techniques consequences on processes implementation.
Examples applied to the main processes used to manufacture the major thermoplastics: polyethylenes (PE), polypropylenes (PP), polystyrenes (PS) and polyvinylchloride (PVC).
Flow charts and principles of processes. Some typical operating conditions.
Influence of operating parameters (temperatures, pressures, monomers ratio and proportion of any chemicals involved in the reaction) regarding the quality of polymer obtained.
Some pretreatments of polymers outside the reactor before the transformation step.

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Training - Practicing Commissioning

PRACOM-EN-P | Face-to-face only | 4 days

This course provides practical knowhow so as to get the participants directly confront the reality of the field

Level

Knowledge

Public

Operating and technical staff in charge of commissioning and start-up operations on field

Objectives

Attendees will be able to implement the following skills:

- Anticipate the risks while commissioning and start-up operations
- Identify the key points of the most current operations
- Proceed to main pre-commissioning and commissioning activities

Pedagogical & technical resources

- Experience sharing through applications and cases studies on Oil & Gas units
- Cases studies on the precommissioning, commissioning and start-up of units
- Analysis of incidents occurred while precommissioning, commissioning or start-up phases

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

COMMISSIONING & START-UP PHASES IN PROJECT CYCLE — 0.5 day

End precommissioning, mechanical completion, commissioning, ready for start-up, start-up permit, performance test runs, temporary and final acceptance.
Commissioning and start-up: a non-linear schedule. SIMOPS. Input data and reference documentation. Punch lists. Management of Change (MOC).

SPECIFIC RISKS TO COMMISSIONING & START UP — 0.5 day

Fluid behavior and energy associated hazards. Chemical and physical hazards. Flammability.

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Main risks induced by equipment, such as rotating, pressure vessels, thermal or naked flame equipment.
Risks related to utilities start-up: inert gas, nitrogen, steam, instrument air, water, fuel gas, diesel.
Risks evolution from construction to start-up. Transient phases. Safety reviews. Managing leaks.

WHAT TO DO BEFORE COMMISSIONING PROCESS UNITS — 1.5 days

End of construction: visual control and checks for static and rotating equipment (no energy, no fluid). Cold clamping. Check of installation standards for piping and instrumentation.
Precommissioning activities: hydraulic tests and process equipment cleaning.
Mechanical completion.
Particular case of Utilities facilities: pre-commissioning, commissioning and start-up (ready for operations).

COMMISSIONING OF PROCESS UNITS & START UP — 1.5 days

Chemical cleaning, flushing and blowing. Equipment drying and dynamic testing.
Particular case of instrumentation - Loops and DCS tests. Synchronization.
Preparation for the start-up of rotating equipment.
Prestart-up checks before oil-in. Plant line-up and test run.
Start-up: leak tests, air removal, oil-in. Heating up and hot bolting.
Update of documentation.

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Training - Practice of PRO-II/Provision or HYSYS Simulation Software

PRO2HYS-EN-P | Face-to-face only | 2 days

This course aims to present an overview of the use of the PRO-II/PROVISION or HYSYS software programs

Level
Knowledge

Public
Engineers looking for a practical introduction to simulation of industrial units

Objectives
Attendees will be able to implement the following skills:

- Simulate stationary processes from their unit operations and available thermodynamic data
- Leverage simulation results

Pedagogical & technical resources
Computer-based case studies with analysis of simulation inputs and outputs

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Complementary informations
The program can be declined under PROII or HYSYS according to the customer's request. For a training course carried out on PROII, the software can be provided from IFP Training with the training . But for HYSYS, the licences of the software should be available from the client's

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

SIMULATION PRINCIPLES & DATA PREPARATION — 0.25 day

Simulation principles: concepts of streams and units.
Getting started with PRO II/PROVISION: start a new simulation or open an existing simulation file, import a keyword input file, export a simulation database.
Presentation of the different menus, ribbon bar buttons, PFD Main Window and PFD palette. Presentation of the input and output files.

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Thermodynamic methods: available models, selection criteria.
Supplying required data for components and feed streams: pure components, petroleum pseudo components, analysis data.

OPERATIONS WITH PURE LIQUID-VAPOR EQUILIBRIA 0.25 day

Analysis of different operations with pure components: flash, compression, depressurization, preheating, vaporization, cooling down, condensation.
Practice analysis of two different cryogenic cycles with propane, operating conditions and impact on the efficiency of the process, representation on the enthalpic diagram and validation of the results. Influence of the purity of the propane and impact of a pollution with little quantity of air.

SEPARATION OF HYDROCARBON MIXTURES 0.75 day

Liquid-vapor equilibria of hydrocarbon mixtures:

- Required data for a liquid-vapor equilibrium (flash) simulation.
- Different types of flash specifications: fixed pressure and temperature, bubble point, dew point, etc.
- Practice: hydrocarbon flashes, water-hydrocarbon condensation.

Distillation:

- Required data for the simulation of a distillation column: number of trays, feeds and products, pressure profile, type of condenser and reboiler, etc.
- Different types of specifications - Available parameters.
- Print options: temperature, rate or composition profiles.
- Practice: design of a depropanizer and a draw-off column.

PRACTICE, CASE STUDIES & COMPLEMENTARY TOOLS 0.75 day

By means of numerous exercises, complementary tools are presented: controller, optimizer, case study, calculator, and their role, efficiency and necessary data are studied.
HYSYS practice:

- Natural gas degasolination by different means.
- Cryogenic cycle (flash, compressor, heat exchanger, etc.): determination of the cooling fluid to be implemented in different cases (use of a “controller”).
- Gas expander cycle (compressor, expander, reactor, heat exchanger, etc.): determination of the efficiency in different cases (use of a “calculator”).

PRO-II practice:

- Distillation column: optimization of the feed inlet tray location (use of an “optimizer” or “a case study”). Heat integration.

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Training - Understanding the Operation of Refining Processes

PRORAF-EN-P | Face-to-face only | 5 days

To bring an in-depth understanding on the running, operation and follow-up of the performances of the different crude oil refining processes

Level
Skilled

Public
Engineers and executives in contact with refinery operators but who are not directly involved in the production unit operation: laboratory personnel, people from the programming or piloting departments, process control, maintenance, research centers, HSE departments.

Objectives
Attendees will be able to implement the following skills:

- Recognize the diagram of the main manufacturing processes
- List the characteristics of the fillers and products of these processes
- Qualitatively evaluate the influence of the main driving parameters of the main manufacturing processes
- Point out the specific problems related to safety, health, and environmental protection in relation to the operation of the units

Pedagogical & technical resources
The efficiency of the training is guaranteed by numerous practical applications related to the operation of these processes that highlight the role of the operating parameters, the specific points in the follow-up and some key-sequences of the operation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CRUDE OIL ATMOSPHERIC & VACUUM DISTILLATIONS — 0.75 day

Adjustment of the quality of the cuts: material balance and cut points; side stream stripping.
Pumparounds: principle, relation with the fractionation capability, crude preheating and energy consumption.

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Corrosion, corrosion control and desalting.
Vacuum systems: operation, failure and remedies.

GASOIL DESULFURIZATION & SULFUR CHAIN — 1 day

Role of hydrotreatments in refining, chemical reactions and catalysts.
Means used for a deep desulfurization: role and compared importance.
Hydrogen consumption and parameters of the hydrogen balance management in the refinery.
Operating parameters of Claus process and unit reliability.
Treatment of Claus stack gas and control of the sulfur emissions to the atmosphere.

CATALYTIC REFORMING & ISOMERIZATION — 0.75 day

Bifunctional catalyst and sequence of the reforming reactions in the different reactors.
Severity: effect on the material balance and the qualities, hydrogen production and the catalyst.
Discontinuous and continuous regeneration: successive steps, layout of the regeneration tower of the RR.
Separation of the isomerate by distillation or chromatography: impact on the octane number.

FLUID CATALYTIC CRACKING — 0.75 day

Conversion: impact of the feed quality and the operating conditions.
Heat balance, temperature optimization and coke production management.
Pressure balance: catalyst circulation, fluidization and combustion safety.
Regenerator operation: complete or incomplete combustion, advantages, incidents.
Potential malfunctions and impact on the environment.

ALKYLATIONS — 0.25 day

Technology of reactors and operating conditions corresponding to the acids HF or H2SO4.
Conducting the acid inventory: consumption and regeneration of acid.
Neutralization and purification of the products exiting the unit.

HYDROCRACKING & PRODUCTION OF HYDROGEN — 0.75 day

Material balance and characteristics of the cracking products.
Operating parameters, process operation, temperature and safety automation control.
Production of hydrogen: efficiency, purity and energy consumption.

VISBREAKING — 0.25 day

Feed structure and stability of the cracked residue.
Follow-up of the evolution of the visbreaking furnace, skin temperature of tubes and decoking.

COKER — 0.5 day

Delayed coking, fluid, fluid with avec gasification.
Technology of coke drums and layout of the valve manifolds. Main decoking steps.
Conversion and recycle ratio at the fractionator. Operating parameters and follow-up of coking in the furnace tubes.

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Training - Process Safety Management

PSM-EN-P | Face-to-face only | 10 days

This course provides the knowledge necessary to acquire a consistent approach to achieve an efficient development to effectively manage process safety in production facilities

Level

Skilled

Public

Engineers, technicians and staff, not familiar with the concepts of process safety, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture

Objectives

Attendees will be able to implement the following skills:

- Describe standards and participate in the deterministic methods of safety engineering
- Explain the different elements of process safety management and identify strategies for implementation
- Identify and describe the safety critical elements in the production process, explain the most relevant features of asset integrity
- Define roles and responsibilities applicable to process safety management
- Establish process safety management objectives

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS OF PROCESS SAFETY — 1 day

Concept of process safety. Historical approach.
Process safety roles and responsibilities.
Safe design principles. Introduction to inherently safer design.

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Concept of loss of containment. Fundamentals of flammability and fluid behavior.
Major accident hazards. Introduction to bowtie diagram representation.

PROCESS SAFETY REGULATIONS — 0.5 day

Identification and compliance with legislation and industry standards.
Best practices standards: OSHA, CCPS.
Relationship with other benchmarking standards: offshore safety case regulation, SEVESO III.

PROCESS SAFETY CULTURE — 0.5 day

Safety leadership and commitment.
Safety culture.
Workforce involvement.
Stakeholders identification and communication.

PROCESS HAZARD ANALYSIS — 1.5 days

Process safety information: products, technology, equipment and human intervention.
Hazards related to typical Oil & Gas process.
Methodology for carrying out a HAZID.
HAZID application.
Introduction to HAZOP methodology. Node identification. Guidewords.
HAZOP register matrix. Group management.
Introduction to What-if methodology.
HAZOP exercise.
Introduction to Failure Mode and Equipment Analysis (FMEA study).
Introduction to fault tree analysis.
Plant layout. Introduction to consequence analysis.

OPERATING PROCEDURES — 1.5 days

Definition of operating phase steps and limits.
Process monitoring. Process control system elements.
Safe isolation of equipment.
Pre-startup safety review. Operational readiness.
Case study: Buncefield.

ASSET INTEGRITY — 2 days

Safety critical equipment. Equipment deficiencies and quality assurance.
Definition and functions of safety systems.
Control of ignition sources. Electrical equipment regulations.
Control of hydrocarbon inventory. Flares and vents.
Introduction to safety instrumented systems.
Fire & gas detection systems.
Passive and active fire protection.
Maintenance procedures and training.
Introduction to corrosion.
Inspection and testing planning and execution.

ORGANIZATIONAL ELEMENTS — 1.5 days

Safe work practices. Permit to work system.
Management of change.
Downgraded situations.
Emergency response planning. Escape, evacuation and rescue.
HSE management of contractors: evaluation and performance monitoring.
Workforce training. Training matrix development.
Human factors in process control. Alarm systems. Human error in process plants.

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Case study: platform P-36.

CONTINUOUS IMPROVEMENT ELEMENTS — 1.5 days

Undesired events reporting and investigation. Analysis strategies.
Management system audit.
Process Safety Key Performance indicators. API RP 754.
IOGP Process safety reporting scope.
Management review.
Case study: Piper Alpha.

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Training - Properties, Storage and Transfer of LPG

PSTGPL-EN-P | **Face-to-face only** | **4 days**

From the properties of Liquefied Petroleum Gas (LPG), the storage, loading/unloading equipment and associated hazards, this training course aims to meet the needs for safe operation in LPG depots, chemical and petrochemical terminals

Level

Knowledge

Public

Staff (field operators, panel operators, shift leaders, young engineers and terminal managers) involved in LPG storage and transfer activities. By extension, any person involved in depot LPG activities (technicians & engineers in Maintenance, Projects, Engineering, Logistics, SHE)

Objectives

Attendees will be able to implement the following skills:

- Describe the procedures for sampling liquefied gases related to the quality criteria and their compositions
- List, according to the regulations, the characteristics of the equipment used for storage, transfer, (de-)loading.
- List the operating rules, guaranteeing safety, to ensure good pumping conditions and to remedy malfunctions of the associated equipment
- Appreciate operating instructions for safe operation

Pedagogical & technical resources

- The pedagogy is active and refers essentially to participants' experience. The documentation delivered to the participants as training medium is also a reference document useful after the training session
- Case studies based on industrial situations

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

LPG PROPERTIES — 0.5 day

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Origins and main components of different liquefied gas: propane, butane, autogas, ethylene, propylene, butadiene, butenes, ammonia.
Main properties related to storage, transfer and different uses: liquid & gas densities, vapor pressure, water content, corrosivity, odor, toxicity.
LPG's finished products specifications and standard tests.

STORAGE TANKS 1 day

Different types: spheres, bullets, semi buried storage, refrigerated storage, underground storage.
Storage operation: equipment, circuits, instrumentation, water purge, sampling...
Safety equipment: safety valves, level switches, fail safe valve, hydraulic check-valve, excess flow valve, water injection, fire & gas detection. Fire protection.

ROTATING EQUIPMENT FOR TRANSFER 0.75 day

Simplified technology of centrifugal pumps, different types of centrifugal pumps used for LPG transfer. Total head, yield, horsepower and motor intensity. Operation of centrifugal pumps, start-up, shutdown, decommissioning, field checks, troubleshooting and operational solutions. Safe operation.
Simplified technology of reciprocating compressors, field checks, troubleshooting and operational solutions. Safe operation.

LOADING & UNLOADING OPERATIONS 0.75 day

Equipment in connection with loading and unloading facilities. Corresponding safe operating conditions.
Marine bulk loading/unloading:

- Basic tankers description. Different loading stations layouts, isolation flange or grounding.
- Loading arms and safety accessories: manual and hydraulic control, quick coupling, movement detection, breakaway coupling, drainage systems.
- Fixed firefighting equipment on board, on shore, safety checklist.

Tank truck and railcar bulk loading/unloading:

- Truck and railcar loading stations: hoses or loading arms, gas phase/liquid phase connections, quantity measurement and control systems.
- Safety and operating equipment on tank trucks and railcars: vessel's hydraulic or pneumatic valves, high level switch, Gestra type valves, breakaway coupling, drainage systems, fire & gas detection, fixed firefighting equipment.
- Procedures.

PRODUCT HAZARDS & OPERATING PREVENTIVE MEASURES 1 day

Flammability:

- Flammability conditions, flammability limits, different types of gas detectors.

Product hazards for the human being:

- Toxics, exposure limits, Safety Datasheet.
- Low temperature burn.

Fluid behavior hazards:

- Heat addition/removal consequences on closed circuit: pressurization, thermal expansion, vessel under vacuum, temperature drop due to vaporization, icing...
- LPG storage pressure control: vapor condensation, cooling systems.
- BLEVE: description of the phenomenon, different consequences, prevention and mitigation.

Examples of different hazardous situations and correct behavior: normal operating conditions (operator field check, purges, sampling), incidents (leak, fire), startup/shutdown operations, maintenance activities...

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Training - Pumps Operation

PUMPOP-EN-P | **Face-to-face only** | **5 days**

This course provides a better understanding of centrifugal and positive displacement pumps technology and operating principles

Level
Skilled

Public
- Engineers and technicians involved in centrifugal and positive displacement pump operation or engineering
- Employees in charge of running and checking pumping system

Objectives
Attendees will be able to implement the following skills:
- Describe the behavior and the operation of pumps
- Analyze the technical solutions applied in their units
- Establish a diagnosis of the incidents and participate in the troubleshooting meetings
- Identify essential elements in pump selection

Pedagogical & technical resources
- Functional approach for a better understanding
- Numerous examples and cases studies from the Oil & Gas production industry and analysis of manufacturer file

Assessment of achievements
Written test upon training course completion

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PUMPING PREREQUISITES — 0.5 day

Pump performance:
- Hydraulic pumping fundamentals.
- Pressure, flowrate, specific gravity, friction losses, centrifugal force, height/pressure relation, mechanic and hydraulic power, vapor pressure curve, energy conservation.
- Pump choice and typical upstream implementations.

TECHNOLOGY & PERFORMANCE — 2 days

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Centrifugal pumps:

- Functional approach: study step by step of the main functions; process (impeller, wear rings, balancing, pump body shape...); sealing: mechanical sealing, typical arrangements (single, dual, dry seal), selection according API 382 standard, materials, type, friction face heating; support (axial and radial, thrust and journal bearings); lubrication (oil and grease...); monitoring (rotor displacement, vibrations, temperature, pressure...).
- Building step by step a monocellular centrifugal pump.

Positive displacement pumps:

- Different types of pumps: rotary and reciprocating pumps.
- Operating principle and utilization of the different types of pumps.
- Influence of clearance, internal leaks, nature of product on flow rate and pressure.
- Flow rate control.
- Installation guidelines: position of tanks, line diameters, metering drums, pulsation dampeners, pressure valves.

Particular choices:

- Coupling and driven machines.
- ATEX: material consequences.

OPERATION & MONITORING — 1.5 days

Preparation: filling, draining; spare pumps: heating, ancillaries.
Start-up/shutdown: priming, controls, hammer shock, risks for process and pump.
Surveillance: parameters (vibration levels, noises, bearing housing temperature, motor intensity, pressures); impact of stream parameters; hazards.
Parallel and series operations: risks, dysfunction.

TROUBLESHOOTING — 0.75 day

Troubleshooting of most frequent problems (cavitation, priming situation, low flowrate...).

SAFETY IN OPERATION — 0.25 day

Leaks, vibrations, feed, overcharge...
Analysis of industrial incidents and accidents.

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Training - Cracking and Chemical Treatments of Purification

RCIVAPO-EN-P | **Face-to-face only** | **5 days**

This course brings technical information on the steamcracker sections focused on chemical transformations: feed cracking, cracked gas purification, hydrogenations or purification stages on a solid (drying)

Level

Skilled

Public

Operating personnel in steamcracking plants: experienced filed operators, panel operators, shift leaders and all technicians involved in the operation of these sections

Objectives

Attendees will be able to implement the following skills:

- Identify key physicochemical characteristics of the process
- Describe the process steps
- Justify process and operating safety measures

Pedagogical & technical resources

- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Case studies done in groups based on typical running situations presented in the course
- Possible contribution of experienced staff in the daily operation of the plant

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BLOCK DIAGRAM OF THE STEAMCRACKER UNIT — 0.25 day

Roles of the various sections.
Feedstock origins, products types, yields.

MAIN PETROCHEMICAL INTERMEDIATES — 0.25 day

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Definition of hydrocarbon families. Feedstock composition.
Potential outlets and main industrial uses of olefinic, diolefinic and aromatics hydrocarbons.

CHEMICAL REACTIONS & CATALYSIS — 1 day

Chemical reactions, chemical reaction uses for the mass balance.
Studies of the thermodynamic conditions to make the chemical reaction feasible.
Chemical reactions limited by the chemical balance, rules to shift the chemical balance.
Rate of chemical reactions. Effect of a catalyst, catalyst behavior. Poisons and inhibitors.
Nota: these basic elements have been provided throughout the course as they enhance the understanding of the different topics.

STEAMCRACKING — 1 day

Onsite unit description; operating conditions of the different sections, product yields.
Analysis of technical characteristics of desired transformations.
Elements of pyrolysis monitoring: definitions of the severity and the selectivity.
Influence of the operating parameters/pressure, temperature, flowrate, steam dilution ratio on the unit performances.
Impact of the feedstock origin on product yields.
Regulation and advanced process control.

CRACKED GASES PURIFICATION — 0.25 day

Main washing systems for cracked gases: selection of systems implemented.
Amine washing system: absorption and regeneration.
Caustic washing system and treatment of waste caustic stream.
The sequence of washing stages in the scrubber.
Influence of the operating parameters on the quality of washing.

DRYING OF CRACKED GASES — 0.25 day

Adsorption-desorption balance.
Operation of cracked gases dryers during the drying and regeneration steps, drying optimization (temperature/run length relationship).

TREATMENTS WITH HYDROGEN — 1.5 days

Role and purpose of the different hydrogenation processes, chemical reaction characteristics, main types of catalysts implemented.
Purification of hydrogen by methanation (if relevant).
Studies of selective hydrogenation units for C2, C3 and C4 cuts and hydrotreatment units for pyrolysis gasolines: analysis of the operating conditions of the unit, operating parameters of the plant, case studies for unit adjustment.

DISTURBANCES - INCIDENTS — 0.5 day

Incidents on the furnace: loss of feed flowrate, high temperature on one or more coils - Loss of firing - Loss of quench water...
Incidents on cracked gases scrubber : loss of caustic make-up, abnormal temperature of the caustic, loss of water washing at the top of the scrubber.
Incidents on dryers: insufficient regeneration, moist gas at outlet.
Incidents in the methanation section (if relevant): loss of the cold box and breakthrough of ethylene to the reactor.
Incidents on selective hydrogenations: management of feedstock inhibitors, changes of hydrogen quality, loss of catalyst activity and/or selectivity.
Nota: this part is delivered through case studies and analysis of feedback of on-site incidents.

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Training - Light Cuts Processing

REF1-EN-P | Face-to-face only | 5 days

This course provides a thorough knowledge of operation and refining processes involved in gasoline and diesel production

Level
Knowledge

Public
Engineers and supervisors involved in light and middle distillates processing units

Objectives
Attendees will be able to implement the following skills:

- Link processing units operation to various constraints set by product specifications
- Analyze operating parameters and their impacts
- Acquire the basics for operating processing units
- Know about the latest developments in these processes

Pedagogical & technical resources
Numerous exercises and case studies based on real industrial situations

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PETROLEUM PRODUCTS — 0.25 day

Origin and characteristics of naphtha cuts.
Octane properties and hydrocarbon (HC) families. Quality requirements.
Gasoil and Diesel oil: cetane, cold flow and other properties.

CATALYTIC REFORMING — 1.25 days

Refinery octane pool: processes for octane improvement-gasoline sources.
Process basics: thermodynamics and kinetics of chemical reactions. Hydrogen production.
Role and types of catalysts - Activation, ageing, poisoning.

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Industrial units: process flow scheme of SR and CCR, operating conditions, performances.
Operating variables (WABT, WHSV, H2/HC ratio, recycle gas composition, pressure).
Management of hydrogen production, impact of feed properties and operating conditions.
Shutdown, regeneration and startup.
Catalyst regeneration steps and control.

ISOMERIZATION OF LIGHT GASOLINES — 0.5 day

Integration in the gasoline production scheme. Isomerization reaction characteristics.
Different types of catalysts: properties, activation, poisons, operating conditions.
Industrial process: principle and specific constraints.
Downstream separation main types and impact of recycling.

HYDROREFINING PROCESSES — 2 days

Removal of impurities, hydrogenation of unsaturated compounds: chemical reactions characteristics.
Role and types of catalysts in relation with feeds, hydrogen consumption and required results.
Operating conditions and main variables (temperature, WHSV, H2/HC ratio, PPH2, etc.).
Catalyst loading map; cycle length optimization.
Main refining applications and specific operating features, example of gasolines and middle distillates desulfurization.

SWEETENING OF LIGHT CUTS — 0.25 day

Role of sweetening process, basic chemical reactions, nature and efficiency of the catalyst.
Main applications for LPG's, naphtha's and kerosene cuts.
Operating conditions: temperature, caustic concentration, mixing efficiency, air injection, etc.

SULFUR RECOVERY — 0.75 day

Refinery sulfur balance. Importance of sulfur recovery chain processes.
Amine scrubbing chemical reactions and operating parameters.
Industrial process and operating parameters as air/H2S ratio, steam production.
Claus chemical reactions.
Process control and impact on environment: causes for sulfur emission increase.
Tail gas treatments: process principles, operating conditions.

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Training - Heavy Cuts Processing

REF2-EN-P | Face-to-face only | 5 days

This course provides a comprehensive knowledge of refining processes available to upgrade heavy cuts into lighter ones

Level
Knowledge

Public
Engineers and supervisors interested or involved in the processing of heavy cuts

Objectives
Attendees will be able to implement the following skills:

- Understand differences between refining conversion processes with regard to planning, operations and investment issues
- Analyze the operating parameters of these conversion processes
- Acquire the basics for operating cracking units
- Know about on the latest developments in heavy cuts processing

Pedagogical & technical resources
Case studies based on real industrial situations

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

OVERVIEW OF CONVERSION PROCESSES — 0.25 day

Origins and characteristics of conversion unit feeds.
Different types of conversion processes (principles, performance, operating ranges, economics): thermal cracking processes, catalytic cracking without hydrogen, catalytic cracking with hydrogen.

THERMAL CONVERSION PROCESSES — 1.5 days

Visbreaking and effects on quantity and stability of heavy fuel oils.
Delayed coking: process characteristics, process flow diagram, purification of the cracked products with

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hydrogen and end destination.
Management of coke drum switch and main steps of the decoking procedure, coke handling.
Flexicoking and fluid coker: principle, integration in the refinery and power.

CATALYTIC CRACKING — 1.25 days

Main fluid catalytic cracking processes.
Catcracking feed characteristics.
Mechanisms of catalytic cracking reactions and mode of action of FCC catalysts.
Yields and characteristics of FCC effluents with overview of purification treatments: propylene recovery, alkylation, ETBE and gasoline pool, LCO hydrotreatment.
Analysis of FCC operating balances.
Summary of operating parameters in the reaction section and in the regenerator.
FCC alternates to treat residues (R2R, HOC, etc.).
Maximization of C3 and C4 olefins, gasoline or cracked gasoil (LCO) production.
Presentation of different process schemes.

DISTILLATE HYDROCRACKING — 1.25 days

Different reactions of the hydrocracking process.
Catalysts: hydrotreating and hydrocracking; poisons and regeneration.
Hydrocracking processes: different types, process flow diagram, operating conditions.
Analysis of hydrocracking operating: parameters, hydrogen balance, sulfur balance.
Associated unit: hydrogen production, sulfur recovery.
Product yields and quality utilizations.

RESIDUE PROCESSING — 0.5 day

Overview of existing processes to upgrade vacuum residues: hydrotreatment, hydroconversion.
Associated units.
Refinery configurations with deasphalting unit.

LUBE BASE STOCKS MANUFACTURE — 0.25 day

Classification and required properties of base oils.
Main lube base stocks manufacturing schemes: vacuum distillation unit, deasphalting, extraction, dewaxing, hydrofinishing.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Catalytic Reforming for Refining and Petrochemicals

REFCAT-EN-P | **Face-to-face only** | **5 days**

This course provides a thorough technical understanding of semi-regenerative and continuous regenerative catalytic reforming processes, for refining and petrochemistry

Level

Skilled

Public

- Engineers, senior operations personnel or technical supervisory staff involved in the operation, optimization or monitoring of hydrogen and aromatics production units
- Engineers from research centers and engineering companies involved in the different aspects of the operation and process control of these processes

Objectives

Attendees will be able to implement the following skills:

- Cite the main physico-chemical characteristics of the process
- Describe the steps of the process
- Justify process and operational safety measures

Pedagogical & technical resources

- Applications, teamwork, case studies and interactive workshops based on typical real situations
- The duration and content of the training course can be customized to the needs of the client site and the profile of the participants
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis
- Parts of or whole session adaptable to virtual classroom

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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THE CATALYTIC REFORMER WITHIN THE REFINERY SCHEME — 0.5 day

Quality specifications of gasolines; reformulated gasoline and future trends.
Octane improving processes, integration within the refining processes.
Needs in hydrogen. Aromatic complex overview, need for benzene, toluene and xylenes.

CATALYTIC REFORMING REACTIONS & CATALYSTS — 1 day

Review of the characteristics of all the chemical reactions: thermodynamics and kinetics.
Influence of the operating parameters on the production of aromatics, hydrogen, octane number, and other yields. Consequences for SR and CCR units.
Catalyst properties: role of the acidic and metallic functions, of the support, of the different promotors and their impact on chemical reactions and yields. Water/chlorine balance and management.
Poisons and ageing factors. Activity follow up and cycle length prediction for semi-regenerative units.
Catalyst regeneration. Management of each step for an optimal activity recovery for SR units. Operating parameters for CCR regeneration loops.

OPERATING PARAMETERS OF A CATALYTIC REFORMER — 1 day

Process flow diagrams and operating parameters of semi-regenerative (SR) and Continuous Catalyst Regeneration (CCR) units. Main control loops. Typical range of yields.
Material balance. Energy consumption.
Operating variables: WABT, WAIT, H2/HC ratio, flow rates, treat gas characteristics.
Main equipment and metallurgy.
Specific features for low pressure equipment. Moving bed technology, recontacting section, catalyst circulation: lifts, ΔP control, seal legs, nitrogen loops for regeneration, etc.
Analyzers and process control.

OPERATION & OPTIMIZATION FOR CATALYTIC REFORMING — 1 day

Monitoring the operating variables and optimization, for semi-regenerative and regenerative units. Operation case studies.
Adjusting to changes in feedstocks origins, N+2A.
High severity of the CCR towards optimized yield in Aromatics. Performance follow-up.
Maximizing the performances of the unit under constraints or limit conditions.
Main steps for start-up and shutdown.

TROUBLESHOOTING FOR CATALYTIC REFORMING — 0.5 day

Case studies: main symptoms encountered in operation, diagnosis and remedies.
Specific troubles of CCR units linked to catalyst circulation and regeneration loops.
Catalyst regeneration problems.
ESD, main safety sequences.

THE REFORMER IN THE AROMATIC COMPLEX — 1 day

Outlets and main uses of BX (Benzene, Xylenes), ethylbenzene.
Basic scheme to upgrade benzene and paraxylene. Aromatic loop.
Transformation processes involved: hydrodealkylation, disproportionation, transalkylation and isomerization.
Associated separation processes.
Operating conditions for a typical arrangement.

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Training - Analysis of Technological Risks

REVSEC-EN-P | Face-to-face only | 5 days

This course makes it possible to select the appropriate safety reviews and know how to implement them

Level
Skilled

Public
Personnel responsible for analyzing HSE risks during design or on existing installations

Objectives
Attendees will be able to implement the following skills:

- prioritize risk analysis results
- list the preparatory elements of the security reviews according to the context (project nine, modifications)

Pedagogical & technical resources

- Simulation of hazard reviews on simple processes
- Use of HAZOP Manager© if requested in advance

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

MODULE 1 - RISK & ACCEPTABILITY CRITERIA — 0.5 day

Risk representation - Risks to people, property and the environment:

- Potential hazard definition, risk levels, risk matrix, acceptable residual risk.
- Safety reviews and risk analysis methods.

Objectives and implementation conditions: integration into the project planning.
Overview of the different reviews and methods. Impact on the Safety Management System (SMS).
Selection of the most appropriate method according to the context: new project, existing site and modifications, updating of hazard studies, authorization to operate...

MODULE 2 - HAZID METHOD (HAZARD IDENTIFICATION) — 1 day

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Organization: identification of attendees, scheduling the review, documentation, preparation, keywords list development.
Animation and conduct of reviews. HAZID review simulation on a simple case.
Preparation of the review report, follow-up and closure of actions/recommendations.
Fields of application of the HAZID method: APR, design reviews, constructability.

MODULE 3 - HAZOP METHOD (HAZARD & OPERABILITY) 1.5 days

Organization: identification of attendees, scheduling the review according to the studies development phase, documentation, preparation of the review, cutting of the PIDs.
Animation and conduct of reviews. HAZOP review simulation on a simple case.
HAZOP quantified.
Preparation of the review report, follow-up and closure of actions/recommendations.
What-if - Check-list: complementarity with the HAZOP method, interests and limits.

MODULE 4 - LOPA METHOD (LAYER OF PROTECTION ANALYSIS) 1 day

Complementarity with HAZOP review. Principle of LOPA.
Concept of safety barriers - Determination of IPL (Independent Protection Layers).
Evaluation of the need for a SIF (Safety Instrumented Function).
Determination of the required SIL (Safety Integrity Level). Understanding of calculation elements (supplier data, databases).
Preparation/animation of reviews, according to IEC 61 511. Simulation of a LOPA on a simple case.

MODULE 5 - USE OF QRA (QUANTITATIVE RISK ASSESSMENT) 1 day

Quantitative Risk Assessment (QRA):

- Overview of the method. Evaluation of the consequences. Probability, IRPA, societal risk, FN curves.
- Scenario determination, Fault Tree analysis (FTA), Event Tree Analysis (ETA).
- Bow tie: principle, construction and use. Safety barriers.

Use of QRAs: determination of design principles and criteria for the safety of an installation.
HSE concept. DAL (Design Accidental Loads).

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Training - Rotating Equipment

ROTMACH-EN-P | Face-to-face only | 5 days

This course provides a good knowledge of the performance, technology and operation of rotating machinery

Level
Knowledge

Public
Engineers, supervisors and technicians involved in rotating machinery operation, maintenance or engineering

Objectives
Attendees will be able to implement the following skills:

- recognize the technology of major rotating machines
- specify how they operate
- list the selection criteria of the equipment in relation to its operation and maintenance taking into account costs and security aspects

Pedagogical & technical resources

- Study of actual equipment and mechanical parts in the workshop
- Use of drawings, datasheets, pictures and videos of actual equipment
- Pumping test bench practical works
- Incidents analysis and improvement proposals

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PUMPS — 2 days

Different types of pumps, applications in the process industry.
Operating principle and technology of positive displacement pumps.
Performance curves of a centrifugal pump: head, efficiency, shaft power, NPSH.
Technology of centrifugal pumps, different layouts.
Mechanical seals: different arrangements, related auxiliary systems.
Operating limits: cavitation, hammering, priming issues, parallel run, operating range.
Start-up and operation monitoring.
Troubleshooting and common failures. Safety and prevention.

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RECIPROCATING & ROTARY POSITIVE DISPLACEMENT COMPRESSORS — 1 day

Different types of positive displacement compressors.
Reciprocating compressor architecture: number of stages, cylinders, overall layout, standard applications.
Technology of main components and auxiliaries.
Influence of process conditions on compressor performance: suction or discharge pressure, suction temperature, gas composition.
Flow control, specific safety devices. Start-up procedures. Troubleshooting.

CENTRIFUGAL & AXIAL COMPRESSORS — 1 day

Description of different types of centrifugal and axial compressors: horizontal/radial split casing centrifugal compressors, axial compressors, integrally geared compressors.
Technology of main components and auxiliaries.
Compression mechanism through a compressor stage. Performance curves vs operating conditions.
Operation limits: low and high speed limits, stonewall, surge, typical anti surge protection systems.
Flow control: throttling valve, rotation speed control, inlet guide vanes. Specific precautions for start-up.
Troubleshooting. Safety.

TURBINES — 1 day

Description of different types of turbines, typical applications.
Steam turbines, gas turbines, turbo-expanders.
Operating principle, classification and technology: exhaust conditions, expansion mechanism through a turbine stage.
Operation: start-up and performance monitoring. Flow control, safety devices.

Sessions

Pau - From 10/19/2026 to 10/23/2026 — **4240 €/HT**

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Training - Safety Engineering - Fundamentals - Module 1

SAFENG1-EN-P | Face-to-face only | 5 days

This course provides the knowledge necessary to assess and mitigate risks, and apply industry-required safety codes and practices when designing, constructing and operating Oil & Gas processing facilities

Level

Skilled

Public

Engineers, technicians and staff, not familiar with the concepts of safety engineering, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture

Objectives

Attendees will be able to implement the following skills:

- Identify HSE standards and describe hazard identification methods of safety engineering in Oil & Gas processing
- Interpret the contents of standard hazard studies
- Explain the safe design principles and to propose mitigation measures
- Define, predict and measure possible outcomes and effects

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUNDAMENTALS OF SAFETY ENGINEERING — 0.5 day

Safety engineering throughout the life of a project and during operations.
Safe design principles.
Risk assessment. Probabilistic and deterministic methods.
Scenario definition. Concept of barriers.

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“PRELIMINARY HAZARD ANALYSIS” - HAZID — 0.5 day

Objectives of preliminary hazard identification during conceptual/feasibility studies.
Hazards related to typical Oil & Gas process.
Methodology for carrying out a HAZID.
HAZID application.

“HAZARD & OPERABILITY” - HAZOP — 0.75 day

Introduction to HAZOP methodology. Node identification. Guidewords.
HAZOP register matrix.
HAZOP exercise.

MAJOR HAZARD ASSESSMENT — 0.75 day

Major Accident Hazard (MAH) scenarios.
Scenario representation. Bowtie diagrams.
Risk reduction process. Risk matrices and ALARP principle.
Safety critical elements.
Major accident hazards analysis. Tools Fault Tree Analysis (FTA) and Event Tree Analysis (ETA).

LAYERS OF PROTECTION — 0.5 day

Concept of Layer of Protection. Characteristics.
Introduction to Safety Instrumented Systems. Emergency shutdown system, blow-down system, introduction to HIPS systems.
Fundamentals of reliability. SIL level.

PLOT PLAN REVIEW — 0.5 day

Fundamentals of consequence analysis for MAH scenarios.
Safety engineering approach to plant layout.
Plant layout exercise.

PREVENTION OF HYDROCARBON IGNITION — 0.5 day

Hazardous area classifications methodology and examples. Electrical equipment and suitability with regard to hazardous area classification.
Safe disposal networks. Flares and vents

INTRODUCTION TO FIRE & GAS SYSTEM — 0.25 day

Fire and Flammable gas detection systems. Technologies and suitability.

PREVENTION OF FIRE ESCALATION — 0.5 day

Introduction to Fire Detection Systems.
Passive fire and blast protection.
Introduction to active firefighting systems. Main elements and applications.

ENGINEERING OF EMERGENCY ESCAPE & EVACUATION RESOURCES — 0.25 day

Alarm system. Types of alarm.
Introduction to evacuation and escape resources.

Sessions

Pau - From 11/23/2026 to 11/27/2026 — **4360 €/HT**

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Training - Safety Engineering - Advanced techniques - Module 2

SAFENG2-EN-P

Face-to-face only

5 days

This course provides the knowledge and tools for coordinating HSE studies, for the different stages of an onshore or offshore, Oil & Gas, grass-roots or major revamping project

Level

Skilled

Public

Safety engineers, HSE superintendents, other engineers and managers (environment, project, process, instrument and operations) involved in operating or designing and implementing major projects

Objectives

Attendees will be able to implement the following skills:

- Describe the probabilistic methods of safety engineering and typical safety systems design
- Design safety systems including firewater, fire and gas detection, and over-pressure relief
- Take part in risk assessment and project evaluation
- Contribute to a corporate, experience-based, safety culture

Pedagogical & technical resources

- Highly interactive training by industry specialist lecturer
- Numerous applications and illustrations
- Several case studies and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INHERENTLY SAFER PLANT DESIGN — 0.25 day

Possible options for the elimination of a hazard.
Provision or addition of control means.

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Limitation of inventories of hazardous products.

CONSEQUENCE ANALYSIS METHODOLOGY — 0.75 day

Examples of types of scenarios to be considered.
Consequence modeling e.g. blast overpressure, dispersion modeling...
Criteria for impact assessment.
Exercise.

QUANTITATIVE RISK ASSESSMENT (QRA) — 1 day

Methodology to be used.
Systematic QRA approach (step by step).
Assessment and improvement.
Case studies and application.

SAFETY INSTRUMENTED SYSTEMS (SIS) — 1 day

Examples of Safety Instrumented Systems and performance targets.
Typical architecture.
Safety Instrumented Function (SIF) and Safety Integrity Level (SIL).
Design of ESD systems, hierarchy of ESD and actions, causes and effects.

DESIGN OF FIRE & GAS (F&G) DETECTION SYSTEMS — 1 day

Selection of F&G detector types.
Positioning of F&G detectors.
Logic associated with the activation of the F&G detectors.

ACTIVE & PASSIVE FIRE PROTECTION — 0.5 day

Design of firewater network, calculations for firewater demand.
Fire protection using water, foam, dry chemicals and inert gas.
Firewater systems, pump types and selection guidance.
Practical exercise.

HUMAN FACTORS & HUMAN ERRORS — 0.5 day

Human factors in process control. Alarm systems.
Human error in process plants. Downgraded situations.
Emergency situations.

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Training - Safety Engineering - Project - Module 3

SAFENG3-EN-P | Face-to-face only | 5 days

This course provides the knowledge necessary to assess and mitigate risks involved in designing, constructing and operating Oil & Gas processing facilities

Level

Skilled

Public

Engineers, technicians and staff (environment, project, process, instrument and operations) involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture

Objectives

Attendees will be able to implement the following skills:

- Apply HSE standards, process hazards analysis methods and key safety management rules
- Explain the contents of standard hazard studies
- Select safety systems including firewater, fire and gas detection
- Take part in risk assessment and project evaluation for offshore and onshore facilities

Pedagogical & technical resources

- Highly interactive and participative training method where a mini-project will be presented, so the different workshop activities will be applied to this project
- Workshop sessions with several exercises, applications, real case studies
- Brainstorming sessions in small groups, with reporting
- Plenary sessions to consolidate fundamental knowledge and discuss results of workshop sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including group presentations

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

SAFETY ENGINEERING MINI-PROJECT FOR A SPECIFIC SURFACE PRODUCTION FACILITY

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Throughout the course, the participants will be guided in the development of safety engineering studies for a production facility. The various workshops performed throughout the week will thus enable the constitution of a safety dossier for a given production facility. Each workshop will comprise of a plenary training session, which will provide the theory required for the participants to then work on their case study. For this purpose, participants will be grouped in teams. Following each case study, debriefing sessions are organized, during which the results are presented by and discussed with the participants.

HAZARD IDENTIFICATION: HAZID/HAZOP — 1 day

Plenary session (0.25 day)

- HSE Fundamentals: definitions, hazard studies, risk assessment, environmental issues.
- Risk analysis methodology: definitions, vocabulary, deterministic and probabilistic methods, preliminary hazard analysis.

Workshop (0.5 day)

- HAZID exercise.
- Hazard and operability (HAZOP) application.

Plenary session (0.25 day)

- Workshop results, Day 1 debriefing, questions-answers.

MAJOR HAZARD ASSESSMENT - CONSEQUENCE ANALYSIS — 1 day

Plenary session (0.25 day)

- Major hazard assessment on process plants.
- Consequence analysis methodology.

Workshop (0.5 day)

- Major accident hazard representation. Bowtie diagram practice.
- Consequences analysis: dispersions, explosions (VCE, BLEVE), boil over, jet fire, etc. Criteria for impact assessment.

Plenary session (0.25 day)

- Workshop results, Day 2 debriefing, questions-answers.

PLANT LAYOUT - QRA — 1 day

Plenary session (0.25 day)

- Plot plan review: safety engineering approach to plant layout.

Workshop (0.5 day)

- Plant layout (safety optimization), plant layout exercise and case study.
- Quantitative Risk Assessment: systematic QRA approach (step by step). Assessment and improvement, applications.

Plenary session (0.25 day)

- Workshop results, Day 3 debriefing, questions-answers.

SAFETY INSTRUMENTED SYSTEMS (SIS) — 1 day

Plenary session (0.25 day)

- Introduction to Safety Instrumented Systems (SIS).
- Fire & Gas (F&G) detection system.
- Emergency shutdown cause and effects matrix.

Workshop (0.5 day)

- Determination of SIL level requirements.
- F&G systems. Case study for layout and equipment selection.

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- ESD causes and effects matrix development exercise.

Plenary session (0.25 day)

- Workshop results, Day 4 debriefing, questions-answers.

FIRE PROTECTION & EMERGENCY RESPONSE — 1 day

Plenary session (0.25 day)

- Passive fire protection.
- Active fire protection.
- Emergency escape, evacuation and rescue resources.

Workshop (0.5 day)

- Active fire protection systems. Case study for layout design and equipment selection.
- Emergency response. Historical incidents.

Plenary session (0.25 day)

- Workshop results, Day 5 debriefing, questions-answers.

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Training - Safety Engineering

SAFENGC-EN-P | Face-to-face only | 15 days

This course aims to achieve deepen knowledge to assess and mitigate risks, and apply industry-required safety codes and practices when designing, constructing and operating Oil & Gas processing facilities

IFP Training Certificate

Advanced Certificate

Level

Skilled

Public

Engineers, technicians and staff, not familiar with the concepts of safety engineering, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture

Objectives

Attendees will be able to implement the following skills:

- Describe risk assessment methods of safety engineering in Oil & Gas processing
- Identify the main advantages and constraints of safety engineering studies
- Identify the necessary safety engineering studies to be carried out during a project
- Interpret the contents of standard hazard studies, explain the safe design principles and propose mitigation measures
- Define, predict and measure possible outcomes and effects

Pedagogical & technical resources

- Several applications and illustrations
- Several case studies and teamwork sessions
- A mini project will be developed and presented during the last week as part of the IFP Training Certificate process

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including group presentations

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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MODULE 1: FUNDAMENTALS — 5 days

Fundamentals of safety engineering.
Preliminary hazard analysis. HAZID.
Hazard and operability. HAZOP.
Major hazard assessment.
Layer of protection.
Plot plan review.
Prevention of hydrocarbon ignition.
Prevention of fire escalation.
Engineering of emergency escape and evacuation resources.

MODULE 2: ADVANCED TECHNIQUES — 5 days

Inherently safer plant design.
Consequence analysis methodology.
Quantitative Risk Assessment (QRA).
Safety Instrumented Systems (SIS).
Design of fire and gas detection systems.
Active and passive fire protection.
Human factors and human errors.

MODULE 3: PROJECT — 5 days

Safety engineering mini-project for a specific surface production facility:

- Hazard identification: HAZID/HAZOP.
- Major hazard assessment. Consequence analysis.
- Plant layout. QRA.
- Safety Instrumented Systems (SIS).
- Fire protection and emergency response.

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Training - Introduction to Process Safety Engineering

SAFENRC-EN-P | Face-to-face only | 5 days

This course provides an overview of safety reviews in a project and highlights the main principles to design and maintain the prevention, mitigation and protection barriers

Level

Knowledge

Public

Managers, engineers, technicians in charge of the design, the modification, the maintenance or the operation of industrial facilities

Objectives

Attendees will be able to implement the following skills:

- Be instrumental in the safety reviews done during a project or plant modification
- Improve process safety practices and reinforce the integration of the human factor from the design stage
- Strengthen the integration of the human factor from the design stage

Pedagogical & technical resources

The pedagogy is active and builds on the experience of the participants and the knowledge of the site:

- several exercises and applications (50% case studies or tutorial exercises), with a "rolling case" on a typical processing unit
- safety impact of a simple modification
- identification of safety barriers with the impact of their maintenance on their effectiveness
- a number of visual aids: videos, learning from incidents (Texas City, Buncefield, Achinsk...)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

RISK IDENTIFICATION — 1.25 days

Risk identification and acceptability with respect to people, environment and assets - Hazard and risk - Residual risk - Risk assessment matrix.

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Review of hazardous phenomena: gas dispersion, toxic release, thermal radiation, overpressure blast.
Preliminary risk quantification: evaluation of risk consequences (grass root project or revamping) based on HAZID/HAZOP reviews.

INHERENT SAFETY DESIGN & LAYOUT OPTIMIZATION — 0.5 day

Layout optimization based on safety reviews: safety distances, fire zones, deluge zones.
Reducing hazardous inventories, leak control systems, disposal system (flare, diked area...) and drainage systems, equipment sealing.

TYPE OF SAFETY BARRIERS — 0.25 day

Safety barriers: technical, organizational, human; prevention, mitigation, protection, active, passive. Criteria of safety barriers' efficiency.

PREVENTION BARRIERS — 1.5 days

Pressure equipment and atmospheric storage tanks: selection of material of construction, corrosion, pressure resistance - Piping classes.
Overpressure and negative pressure protection: pressure safety valves, rupture discs: selection criteria, design, implementation, inspection.
Safety Instrumented Systems (SIS) and Safety Integrity Level (SIL) - Typical architecture of Safety Instrumented Systems: hierarchy, interaction with process control system and Fire & Gas system.
Flammability control: minimizing ignition sources, hazardous area classification, equipment selection and location in hazardous areas.

DETECTION, MITIGATION & PROTECTION SYSTEMS — 0.75 day

Fire and gas detection system: technology of sensors, selection and location - Cause and effect matrix, voting - Relationship with mitigation systems.
Passive fire and blast protection: description of material, location, monitoring and inspection - Identification of surface/elements to be protected.
Active firefighting systems: extinguishing agents (water, foam, dry chemicals, inert/inhibition gas).
Fixed systems with water or foam: elements of the fire main system (main ring, fire water pumps, consumers, water tank, foam solution), application rate.

DAY-TO-DAY INDUSTRIAL RISK MANAGEMENT — 0.75 day

Human factors: functioning of the human being - Examples of systems embedding human behavior or human error: equipment accessibility, plant ergonomics, graphic display design, alarm management...
Management Of Change (MOC): technical, organizational and human expertise (reliability of documentation, suitability/application of the procedures, corporate's specifications...).
Maintaining the efficiency of the barriers - Example of a risk management tool: the bow tie.

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Training - Developing a low Carbon Strategy: From Carbon Footprint Measurement to transition Plan

SBC-EN-P | Face-to-face only | 3 days

Since the Paris Agreement, countries have agreed on a global warming threshold that should not exceed 2°C above 1850 levels by 2100. This implies, first and foremost, reducing anthropogenic GHG emissions, which governments are translating into their own legislation. Companies must therefore transform and act to measure their carbon footprint and build a robust climate strategy

Level

Knowledge

Public

Anyone wishing to discover and/or deepen their knowledge of GHG emissions quantification and reporting methods (GHG Protocol, Bilan Carbone®, ISO 14064/69).
This course is aimed at: company and engineering office staff working as HSE or CSR coordinators, project managers & consultants on sustainability

Objectives

Attendees will be able to implement the following skills:

- Master the main principles of a carbon footprint assessment.
- Differentiate between the different available national & international standards for carrying out your company's carbon footprint (GHG Protocol, Bilan Carbone®, ISO 14064/69).
- Identify the key stages following the completion of a carbon footprint (emissions reduction target, action plan, integration into low-carbon strategy .... etc.).

Pedagogical & technical resources

- Quiz.
- Case studies.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

Basic knowledge on climate change and MS Office Excel.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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WHY TAKE THE DECARBONIZATION ROUTE — 0.5 day

Identify the causes and consequences of climate change.
Understand the nature of climate change.
Climate change and its impact on business.
Identify the challenges raised by the energy transition.

KEY STEPS IN A CARBON FOOTPRINT ASSESSMENT — 1 day

Identify regulatory requirements for carbon footprint.
Carbon accounting standards (GHG Protocol, Bilan Carbone®, ISO 14064/69).
Describe the objectives of a carbon footprint.
Identify the scope of the carbon footprint (organizational, operational and temporal).
Drawing up flow maps.
Data collection and processing.
Handling carbon footprint measurement units.
Interpreting the results of a simple carbon footprint case study.
List existing reporting formats for publishing carbon inventory.
Case study: Evaluating a company's GHG emissions according to carbon accounting standards.

HOW TO SET A GHG REDUCTION TARGETS — 0.5 day

Identify the steps that follow a carbon footprint (emission reduction target, action plan, contribution to carbon sequestration, etc.).
Define the notion of carbon neutrality within the SBTi framework (Science Based Target Initiative).
Setting a science-based GHG reduction targets (commitment timeframe and scope).
Examples of targets setting according to SBTi standards (Absolute Approach ACA and Sector Approach SDA).

HOW TO BUILD A LOW CARBON ROADMAP — 0.5 day

Diagnose the risks and opportunities of the ecological transition.
Diagnose physical risks.
Define a strategy and an ecological transition project.

SETTING A TRANSITION PLAN — 0.5 day

Identification of potential actions to implement the strategic plan.
Selection of the most relevant set of actions for implementation.
Identify the levers for actions within the company, depending on its structure and sector.
Monitoring and guiding the implementation of the action plan.
Case studies: Building a company's transition plan according to international standards.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Process Diagrams (PFD-PID)

SCHEPRO-EN-P | **Face-to-face only** | **2 days**

This course provides practical keys to read and use process diagrams

Level

Knowledge

Public

Technical staff using process diagrams

Objectives

Attendees will be able to implement the following skills:

- Use the symbols of a PID legend
- Read process diagrams

Pedagogical & technical resources

- Use of a set of complex PIDs to understand process flow, instrumentation loops, equipment characteristics...
- PID review with checklist/HAZOP initiation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BLOCK DIAGRAM & PROCESS FLOW DIAGRAM (PFD) — 0.5 day

Splitting a process in blocks. Elaborating a block diagram.
Use of a PFD, added value compared to the block diagram. Type of information included in a PFD.
Symbols used for each element.
Importance of Utility Flow Diagrams (UFD). Complementarity with process flow diagrams.

PIPING & INSTRUMENTATION DIAGRAM (PID) — 1 day

Purpose of PIDs: users from engineering phase to operation.
Process and utilities PIDs. Key elements indicated on PIDs. PID legend. Typical symbols.
Design and organization of a PID, level of detail. Notes, holds, comments.
Contents of a PID. Evolution according to design/operation phases.

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Documents associated with a PID.

P&ID REVIEWS — 0.5 day

Design reviews: focus on HSE and operability with HAZOP review.
Organization of the review, selection of attendees. Action plan. Validation. Reporting and follow-up process.

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Training - Occupational Health and Safety

SECO1-EN-E | **E-Learning** | **1 hour**

This e-learning module take place within a development path regarding safety in plant operation. These modules are integrated into some of our Blended Learning courses but can also be followed independently

Level
Knowledge

Public
All industrial plant staff faced with products hazards

Objectives
Attendees will be able to implement the following skills:
- List the various potential hazards on an installation

Assessment of achievements
- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Complementary informations
For any information please contact us at the following address: contact@ifptraining.com

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

VOCABULARY & SAFETY INDICATORS

Hazard, risk and accidents: definitions and associated consequences.
Occupational accidents: figures and trends.

POTENTIAL HAZARDS IN FACILITIES

Occupational risk reduction: human, organizational, technical factors.
Human being: advantages, weakness and limits.

HAZARDOUS PRODUCTS CLASSIFICATION

SGH recommendation, CLP regulation: objective and field of application.
Hazards classification and linked definition.
Hazardous material characteristics: where can you found relevant information?

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Training - Flammability

SECO2-EN-E | **E-Learning** | **1 hour**

This e-learning module take place within a development path regarding safety in plant operation. These modules are integrated into some of our Blended Learning courses but can also be followed independently

Level
Knowledge

Public
All industrial plant staff faced with products hazards

Objectives
Attendees will be able to implement the following skills:

- Describe the mechanism of ignition, including potential sources of ignition and possible preventive measures

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Complementary informations
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Program

COMBUSTION PHENOMENON

Combustion definition.
Elements necessary to achieve combustion.
Gaseous, liquid and solid combustible materials.
Oxidizers: oxygen in the air and strong oxidizers.

IGNITION SOURCES & CONSEQUENCES OF A COMBUSTION

Ignition sources: energy required level.
Ignition sources in industrial plant.
Possible consequences of a combustion.

PREVENTIVE MEASURES AGAINST PRODUCT HAZARDS CLASSIFICATION

Action on one of the three elements from the fire triangle.

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Explosimeter operating principles.
ATEX area: definition and precautions associated.

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Training - Occupational Health

SECO3-EN-E | **E-Learning** | **1 hour**

This e-learning module take place within a development path regarding safety in plant operation. These modules are integrated into some of our Blended Learning courses but can also be followed independently

Level
Knowledge

Public
All industrial plant staff faced with products hazards

Objectives
Attendees will be able to implement the following skills:

- Indicate the sources of information available to know the effect of a product on the human body

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Complementary informations
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Program

PRODUCTS TOXICITY

Poisoning: ingestion, metabolism and elimination.
Acute toxicity, chronic toxicity.
Threshold limit values.

SPECIFIC RISKS FROM MOST COMMON PRODUCTS USED IN PLANTS

Anoxia phenomenon.
CMR compounds: identification and prevention.
Some toxic materials features: H2S, carbon monoxide, ammonia.

CHEMICAL RISK PREVENTION

Chemical risk assessment.
Material safety datasheet understanding.

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Gas detection means and personal protective equipment.

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Training - Fluids Behavior

SECO4-EN-E | **E-Learning** | **1 hour**

This e-learning module take place within a development path regarding safety in plant operation. These modules are integrated into some of our Blended Learning courses but can also be followed independently

Level
Knowledge

Public
All industrial plant staff faced with products hazards

Objectives
Attendees will be able to implement the following skills:
- Explain the origins of pressure in a vessel depending on the nature of the fluid

Assessment of achievements
- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Complementary informations
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Program

PRESSURE IN A VESSEL

Definition and reminder of physical units.
Pressure effect in a vessel full of, gaseous, liquid gas, or liquid.
Vaporizing pressure curve analysis.

HEAD ADDITION CONSEQUENCES

Case of a vessel full of, gaseous, liquid gas, or liquid.
Specific phenomena: BLEVE, slop-over, froth-over, boil-over.

HEAD REMOVAL CONSEQUENCES

Collapsing risks due to vacuum.
Freezing due to pressure drop.

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Safety in Plant Operation

SECOP-EN-P | **Face-to-face only** | **4 days**

This course provides trainees with a better understanding of product and equipment risks in order to ensure safe operation

Level

Knowledge

Public

Operating personnel (operators, panel operators, shift leaders, engineers) in refineries and petrochemical/chemical plants; any staff involved in operations (maintenance, SHE department)

Objectives

Attendees will be able to implement the following skills:

- Identify risks related to products used on a facility
- Identify the recommended preventive measures in view of the importance of the risk
- Order the different phases of the provision of a facility

Pedagogical & technical resources

- E-learning modules before the training to learn & refresh knowledge about risks
- Workshop: preparation of shutdown, decommissioning or/and commissioning, start-up procedure for a typical unit
- Case studies and analysis of incidents and accidents

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

OPERATIONS & HSE — 0.25 day

Hazards and risks incurred. Consequences.
Risk management means: equipment, organizational and human aspects.

MAIN HAZARDS OF HYDROCARBON PROCESSING — 0.75 day

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Flammability: flame ignition and propagation principles. Types of combustibles, oxidizers and most common ignition sources in process facilities.
Toxicity: exposure limits. Specific hazards associated to H2S. Use of Safety Data Sheet (SDS).
Fluid behavior and related hazards: vessel pressure, consequences of temperature variation (thermal expansion, vaporization, vacuum, water hammer).

SAFETY IN PROCESS OPERATIONS — 2.75 day

Precautions and risks related to the use of utilities: inert gases, liquid water, steam, air, gas oil, fuel gas.
Safety related to blowdown and drainage toward: flare, slops, tanks, oily water...
Blinding (lockout/tag-out) procedures: conditions for installing blinds or spades.
Degassing-inerting: steam, nitrogen, water, vacuum...
Works permits: different types and use.
Entry into vessels. Atmosphere analysis: oxygen content, explosivity, toxicity.
Start-up: checks, accessibility and cleanliness, line up, nitrogen, water, steam or vacuum deaeration.
Tightness testing; commissioning and start-up.

HANDS-ON ACTIVITIES ON A TYPICAL UNIT DECOMMISSIONING

Case study, common thread of this training, used as a workshop with different groups of trainees in order to apply the different topics for decommissioning and commissioning & Start Up. Procedure writing with instructions for each step. Presentation to the group, sharing & discussions. Lessons learned.

IMPLEMENTATION OF THE PRINCIPLES & GUIDELINES

Preparation of shutdown, decommissioning or/and commissioning, start-up procedure for a typical unit. Common thread throughout the training, carried out sequentially during the session, in order to increase mutual understanding of decommissioning principles. Lessons learned.

HUMAN BEHAVIOR & SAFETY MANAGEMENT — 0.25 day

Human factors. Safety barriers, compliance with procedures, risk of routine.
Employees' involvement: commitment and responsibility.
Available tools to improve safety: procedures, risk assessment, safety meetings, accident investigation and reporting, audits, field observations, emergency drills.

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Training - Safety in Storage and Loading Operation

SECORSE-EN-P | **Face-to-face only** | **4 days**

This course provides a better understanding of product and equipment risks in order to increase safety behavior in storage and (un)loading activities.

Level

Knowledge

Public

Operating personnel (operators, panel operators, shift leaders, young engineers and terminal managers) in refineries and petrochemical/chemical plants and any staff involved in operations (maintenance, SHE department).

Objectives

Attendees will be able to implement the following skills:

- Identify the risks related to the products used on a facility and the various materials present on the storage units
- Identify possible preventive measures
- Order the different phases of the provision of a storage facility

Pedagogical & technical resources

- E-learning modules before the training to learn & refresh knowledge about risks
- Workshop: decommissioning and commissioning procedure for a typical unit selected based on trainees' origins (atmospheric tanks, under pressure storage, recovery unit, etc.)
- Case studies and analysis of incidents and accidents
- Agenda can be adapted to professional needs from the group of attendees

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

RODUCTS RISKS: PREVENTION & OPERATING PRECAUTIONS — 0.75 day

Case studies involving products risks analyzed in subgroups, in order to strengthen information from the e-

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learning. Share ideas with the entire group. Lessons learned.

EQUIPMENT RELATED RISKS - SAFETY DEVICES 1.25 days

Atmospheric and under pressure storage tanks: different kinds of construction, pressure and vacuum resistances, safety devices (vents, relief valves, hydraulic safety shut-off valves, positive safety valves, etc.).
Safety in tank storage operation. Typical incidents.
Loading/unloading tank trucks, railcars, tankers, etc.: loading stations layout (top or bottom fillings), safety devices & safety instrument systems, vapor recovery.

SAFETY IN STORAGE TANKS COMMISSIONING & DECOMMISSIONING OPERATIONS 2 days

General decommissioning approach with 5 different steps. “Zero energy” approach. Understanding & complying to procedures, risks from routine.
Draining-purging-blowdown: safety and environmental aspects.
Degassing-inerting-cleaning: HP cleaning and pumping liquid wastes, type of pumping according to products (volumetric pump, vacuum)
Lockout/Tag-out procedure (LOTO): type of LOTO according to different activities planned.
Works permits: endorsement and responsibilities.
Activities with specific risks: confined space entry. Gas test, ventilation, supervision.

HANDS-ON ACTIVITIES ON A TYPICAL STORAGE EQUIPMENT DECOMMISSIONING

Case study, common thread of this training, used as a workshop with different groups of trainees in order to apply the different topics. Procedure writing with instructions for each step. Presentation to the group, sharing & discussions. Lessons learned.

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IFP Training

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Training - Safety in Maintenance and Construction Works

SECTRA-EN-P | **Face-to-face only** | **4 days**

This course provides expert knowledge of risks related to construction and maintenance works and insight on how to promote safety practice and ensure safer work conditions and behavior

Level

Knowledge

Public

- Maintenance, operational and SHE staff who handle work permits and monitor contractors on operating plants
- It is also suited for contractors staff in charge of maintenance and construction works

Objectives

Attendees will be able to implement the following skills:

- List the risks associated with the different phases of work
- Identify appropriate means of prevention
- Clarify the responsibilities of each actor

Pedagogical & technical resources

- Detailed case studies based on actual accidents or incidents
- Sharing of experiences among participants

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

OCCUPATIONAL HEALTH & SAFETY — 0.25 day

Hazard, risk, accident: definitions and differences.
Occupational hazards: related to products, operation and equipment, workplace, and human behavior.
Identification and classification of hazards during execution of maintenance and construction works.

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PRODUCT-RELATED HAZARDS & PRECAUTIONS — 0.5 day

Product-related hazards in refineries, petrochemical and chemical plants: main properties (flammable, explosive, toxic, noxious, corrosive, asphyxiating, harmful for the environment), CMR specific case.
Toxicology: threshold limit values.
Flammability: explosive atmosphere (combustible products: gaseous, liquid and solid); oxidizers; ignition sources (flames, self-ignition temperature, sparks and static electricity, etc.).
Preventive measures and precautions: during normal conditions, before and during hot works, in the event of leaks.

WORK-RELATED HAZARDS — 2.5 days

Decommissioning: risks related to equipment opening and line breaking, isolation procedure, blinding and spading work. Lockout tag-out procedure.
Material transportation equipment, manual and mechanical handling.
Lifting: recommendations regarding lifting equipment, worksite organization, and team composition.
Work in confined spaces: vessel opening, ventilation, gas testing, entry permit, risk variation during work execution.
Work at height: rules for installing and using scaffolding, MEWP (Mobile Elevating Work Platform), and harnesses.
Hot works: welding, cutting and heating, grinding.
High pressure cleaning: use of cleanup tank trucks. Specific risks linked to vacuum pumping.
Miscellaneous works: excavation works, abrasive blasting, painting.
Hazardous radiation: working with radioactive sources, X-ray work, specific risks.
Risks related to electrical work and devices.
Specific Personal Protective Equipment (PPE), recommended for each kind of works.

RISK MANAGEMENT & PREVENTION — 0.75 day

Safety procedures: work permit types and validity; purposes, application, job safety analysis, precautions, constraints; commitment and responsibility of contractors, maintenance.
SHE and issuing operation department; permit endorsement.
Planning and monitoring safety of contracted works on site: coordination with contractors, co-activity and interface management; preparation of prevention plan and risk assessment.
Hazards resulting from unsafe acts and/or unsafe conditions: sources of hazards, task/risk analysis, managing contractors and subcontractors.
Management Of Change (MOC).

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Training - Industrial Safety Engineer

SECUIND-EN-P | Face-to-face only | 35 days

This course provides a deeper knowledge on how to master the main aspects of the industrial safety engineer position

IFP Training Certificate

Graduate Certificate

Level

Skilled

Public

Engineers recently assigned to the HSE department in the following industries:

- Also available for experienced personnel designed to evolve in HSE function

Objectives

Attendees will be able to implement the following skills:

- List the tools needed for overall security management
- List the techniques needed for overall safety management
- Cite the strengths and weaknesses of the tools according to the context
- Clarify the limitations of the techniques needed for overall safety management
- Describe the roles of an industrial safety engineer

Pedagogical & technical resources

- Practical workshops on industrial equipment
- Site visit and studies based on industrial documents
- Real-life firefighting exercises
- Lecturing by industry experts
- Real incidents and accidents case studies
- Continuous validation, in order to obtain IFP Training Certificate

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

WELCOME - PRESENTATION — 1 day

- Initial competency assessment.
- Role of HSE engineer within company. Mission and responsibilities of the safety engineer.

RISKS RELATED TO FLUIDS BEHAVIOR — 4 days

- Process mapping. Products knowledge.
- Gas compression and expansion. Liquid-vapor equilibrium. Energies at stake.
- Pressure in a vessel and consequences of heat addition or withdrawal. Risk assessment and operating precautions.

RISKS RELATED TO EQUIPMENT — 5 days

- Piping - Thermal equipment - Storage equipment - Pressure vessels.
- Transport - Loading/offloading units: tank trucks, tank rail cars, cargo ships.
- Rotating machinery: pumps, compressors, steam turbines, gas turbines...
- Instrumentation and process control.

INHERENTLY SAFER DESIGN — 5 days

- Phenomenology: phenomena of combustion: combustion of gaseous mixtures, liquids and solids. Effect of combustion. BLEVE/boil-over/backdraft/flash-over.
- Taking industrial risk into account.
- Layout based on risk analysis. Implementation of safety barriers: kinds and criteria of effectiveness.
- Prevention and care against fire and explosion hazards: control or removal of flammable mixtures, sources of ignition. Control of emission sources.
- Knowledge of pressure equipment and atmospheric storage - Protection against overpressure and depressions.
- Introduction to instrumented safety systems (SIS). Reliability level.

MITIGATION & PROTECTION MEANS — 5 days

- Gas detectors, fire detectors (smoke, flames, heat, etc.), liquid hydrocarbons detectors.
- Passive and active fire protection.
- Firefighting strategies: basic rules, means and methods of intervention, organization and management of rescue, strategy of intervention. Emergency response plans.

CONTROL OF RISKS RELATED TO WORK ON FACILITIES — 5 days

- Safety during commissioning and decommissioning operations.
- Lockout tag-out procedures.
- Safety in maintenance and construction works: specific risks and corresponding precautions. Permit to work. Integration of safety in preparation, implementation and work surveillance.

HSE RISK MANAGEMENT — 5 days

- Health, Safety and Environment Management System (HSE-MS): structure, implementation and administration of a HSE management system.

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- Setting up an HSE culture.
- Risk assessment methods: HAZID, HAZOP, Bow tie analysis, QRA.
- Prevention tools and means, crisis and intervention management. Human factors.
- Management of change - Improvement and maintenance of safety barriers HSE approach in projects.

ENVIRONMENT PROTECTION — 2 days

- Importance of environment protection for human being, for company. Awareness - Sustainable development.
- Environment impact assessment.
- Air, water and soil protection. Origin, nature, treatment and reduction of pollutions.
- Waste management: sorting and elimination routes.

INDUSTRIAL HYGIENE - HEALTH AT WORK — 2 days

- Professional risks: chemical risks, physical risks, toxicological risks.
- Prevention. Collective and personal protection equipment.
- Risk management: work station assessment, material safety data sheet, medical check-up.

FINAL ASSESSMENT - SESSION SYNTHESIS — 1 day

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Training - Oil and Gas Process Simulation

SIMUL-EN-P | Face-to-face only | 5 days

This course provides a comprehensive knowledge of all field treatments, and develops practical skills in simulation of Oil & Gas treatment processes using the software HYSYS™ and PRO/II™

Level

Knowledge

Public

Process design engineers involved in conceptual design, basic or detailed engineering of Oil & Gas field treatment processes

Objectives

Attendees will be able to implement the following skills:

- Understand Oil & Gas processing operations: flash separation, compression, expansion, heating or cooling, mixing, pumping, etc.
- Grasp common Oil & Gas processing schemes and operating parameters
- Build a Process Flow Diagram (PFD) and optimize existing processing schemes
- Simulate an industrial unit at different operating stages
- Extract thermodynamics data from the simulation software database (phase envelope, critical point parameters, hydrate formation risk area, different physical properties...)

Pedagogical & technical resources

- Highly interactive training by industry-specialist lecturers
- Several simulation case studies, addressing most of Oil & Gas field treatments
- Extensive practice of PRO/II™ and HYSYS™ simulation software

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

SOFTWARE PRESENTATION — 0.25 day

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Presentation of the different pieces of equipment: pumps, compressors, heat exchangers, turbines, turbo expanders, separators, valves, pipes.
Choice of the thermodynamic model: PR, SRK...
Definition of components, pseudo-components, heavy cuts.

SIMULATION OF A CRUDE OIL FIELD TREATMENT UNIT — 1 day

Main field treatments for crude oils: stabilization, sweetening, desalting and dehydration, associated gas compression and treatment.
Study of an offshore crude oil field treatment unit, based on Multiple Stage Separation (MSS).
Influence of the number of separators on the quality (API°, RVP...) and quantity of stabilized oil.
Optimization of the operating parameters: pressures and temperatures of separators, suction and discharge condition of compressors, pumping needs for export by pipe.
Identification and adjustment of the controlling parameters.

SIMULATION OF A NATURAL GAS FIELD TREATMENT UNIT — 1 day

Main field treatments for natural gases: dehydration, sweetening, LNG extraction/recovery, compression and export...
Study of an offshore natural gas dehydration, liquids extraction and compression unit.
Optimization of the operating parameters: primary separator operating conditions, dehydration parameters, cooling temperature for a sufficient liquid extraction, compression needs upstream the export pipe.
Identification and adjustment of the controlling parameters.
Analysis of hydrate formation risks.

SIMULATION OF A GAS DEHYDRATION UNIT BY PHYSICAL ABSORPTION (TEG) — 0.75 day

Simulation of the glycol loop: contactor, flash separator, regenerator (still), circulation pumps, glycol/glycol exchanger.
Adjustment of controlling parameters: dry gas residual moisture content versus purity of lean TEG, moisture flow to be removed versus TEG circulation flow.

SIMULATION OF A NATURAL GAS LIQUIDS (NGL) EXTRACTION/RECOVERY UNIT — 0.75 day

Progressive build up of the PFD of a Natural Gas Liquids (NGL) extraction unit.
Three processes are studied:

- External refrigeration loop (cryogenic loop).
- Joule Thomson expansion valve.
- Turbo Expander.

Illustration of the results on phase envelope diagram.

SIMULATION OF A PROPANE CRYOGENIC LOOP — 0.75 day

Study of a simple loop.
Improvement of loop performances by addition of an intermediate expansion.
Use of propane enthalpy diagram to validate the software results.
Influence of propane purity and consequences of air ingress.

SIMULATION OF NATURAL GAS LIQUID FRACTIONATION UNIT - DISTILLATION PROCESS — 0.5 day

Principle of separation by distillation process and main operating parameters.
Simulation of a LNG fractionation unit using distillation columns.
Characteristics and operating conditions of the main equipment. Specific constraints.

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Training - Design and Operation of a Safety Instrumented System (SIS)

SIS-EN-P | Face-to-face only | 2 days

Understand how a risk can be reduced by an instrumented safety barrier

Level
Skilled

Public
Engineers and technical staff involved in design of SIS

Objectives
Attendees will be able to implement the following skills:

- Determine the Safety Integrity Level (SIL) of a simple system
- List the main elements of the IEC61511 standard in the context of the design of SIS to better justify its relevance of implementation

Pedagogical & technical resources

- Step by step case study
- Study of SIS on mini processes test benches

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
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Program

SIS & SAFETY BARRIERS — 0.5 day

Different safety instrumented systems: PSS, ESD, F&G, HIPS, ESP.
Links between the different SIS - Global architecture.
Control loop: basic knowledge; elements constituting a SIS.

SIS & INDUSTRIAL RISK CONTROL — 0.5 day

Use of safety reviews (HAZOP & LOPA & HAZOP) to determine the need for a Safety Instrumented Function (SIF).
Concept of independent protective layers.

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Use of a risk matrix to determine the level of SIL required for each RIS.

SIS SPECIFICATION — 1 day

Role of functional analysis.
FIS allocation, cause and effect matrix, redundancy and common mode.
Typical design.
Simple SIL calculations. Analysis of supplier documentation.
SIL level and frequency of testing.

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Training - Social Risk Management

SOCIAL-EN-P | Face-to-face only | 5 days

This course aims to identify and understand social issues related to Oil & Gas activities

Level

Knowledge

Public

Managers, advisors, engineers, and operations staff involved in oversight or management of operational, environmental and social issues throughout the lifetime of an upstream project

Objectives

Attendees will be able to implement the following skills:

- Identify and understand what constitutes a social risk (non-technical risk), an impact assessment and management
- Understand key concepts related to SIA and Social Impact Management Plans (SIMPs)
- Understand social management methodologies and their appropriate uses
- Design and implement of a stakeholder engagement strategy and plan
- Understand the main components of a Social Impact Management Plan (RAP, local content, etc.), including design and implementation

Pedagogical & technical resources

The training will have an interactive format providing room for practice and discussion. It will involve multimedia presentations, case studies, quizzes and teamwork sessions

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

SOCIAL ISSUES RELATED TO OIL & GAS ACTIVITIES: RISKS, STAKES & STRATEGIES — 1 day

Risk of overlooking non-technical risks.
How to spot non-technical risks?

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How to identify and understand the underlying mechanisms?
How to manage social risks?
Oil & Gas industry reaction to underlying mechanisms.
Why and how should they be managed as a risk and an opportunity?
Key risks areas for Oil & Gas industry and developed standards: transparency and corruption, business and human rights, operations in areas of conflict, etc.

STAKEHOLDER ENGAGEMENT — 1 day

Social License to Operate (SLO).
How to build this SLO?
What is the Free Prior & Informed Consent (FPIC) principle?
Stakeholders-business interactions analysis.
How to do a stakeholder analysis and mapping?
How to design and implement a stakeholder engagement plan?
How to design, implement and monitor a grievance mechanism?
What are the do's and don'ts in stakeholder engagement?

PARTICIPATIVE SOCIAL IMPACT ASSESSMENT AS A RISK MANAGEMENT TOOL — 1 day

Conceptual framework and techniques used for Social Impact Assessment.
International standards.
Definition of a social impact.
Links between environmental and social impacts.
Predict, analyze and assess the likely social impacts pathways and evaluate their significance.
Develop a mitigation strategy for negative impacts and an enhancement strategy for the project-related opportunities.
How to monitor social impacts?
How to assess a SIA quality?
How to achieve the full potential of a SIA?

SOCIAL IMPACT MANAGEMENT PLANS & MONITORING: TOOLS & PROCESSES — 0.5 day

Social Impact Management Plans (SIMP).
The main components of a SIMP.
How can a SIMP be operational?
What are the organizational and institutional arrangements that need to be developed?
The role for the project's stakeholders in a SIMP?
Implementation and results monitoring and reporting.

SOCIAL IMPACT MANAGEMENT PLANS & MONITORING: FOCUS ON SPECIAL TOPICS & ISSUES — 1 day

Depending on the audience's needs and expectations, a focus can be put on specific social issues and how to manage them through specific social impact management plans: Resettlement Action Plan (RAP), Community Development Plan and Social investments, local content, etc.

CASE STUDY: SOCIAL SCREENING OF AN OIL & GAS PROJECT — 0.5 day

Through a work in group, the participants will do a stakeholder mapping, a high level impact assessment with the use of a mind mapping and an identification of potential impacts and mitigation strategies.

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Training - Soft skills for top manager

SOFTADV-EN-D | Distance only | 16 hours

During this session, the participants will learn fundamentals behavioral techniques for top managers. More attuned to different personalities and situations, participants will improve their influence and will know how to lead within changing environment and crisis

Level

Expert

Public

Top managers of the energy and process industries areas

Objectives

Attendees will be able to implement the following skills:

- Self-management: improve self-knowledge; deal will emotions and stress; save time,
- Leadership and communication: bring trust through communication posture and deep listening skills; supporT learning and progression and foster virtuous behaviors through the chain of command with the accurate managing style; manage across cultures,
- Change management: lead change and manage crisis; managing posture, mindset and decision making in changing environment.

Pedagogical & technical resources

- Experiences sharing.
- Exercises.
- Definition of a personal action plan.

Assessment of achievements

Personal action plan review.

Prerequisites

Having managed a team for 2 years at least.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

INTRODUCTION

Presentation of the module, its organization, requirements and tools.
Presentation of the attendees, expression of needs and expectations.
Introduction to DISC Model: DISC instructions and questionnaire.

SELF MANAGEMENT

Q&A Session on DISC profiles.
How to behave and better communicate with different profiles.

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Getting familiar with DISC Method through a collaborative game.
Self-coaching tool: personal action plan.

DEAL WITH EMOTION & STRESS

Assess emotional intelligence.
Use and manage emotions to build confidence.
Identify stressors and manage stressors.
Stress management tools and routine for optimal performance.
Stage fright fight tools.

COMMUNICATION POSTURE & DEEP LISTENING

Tricks and stakes of the communication scheme.
Select the proper communication channel.
Positive communication elements.
Understanding deep listening: When do we need to use it? What are the benefits? Which posture?
Develop personal listening skills techniques.

SAVE TIME

Self-management along with emotion and stress management provide precious tools for time management.
Fighting out personal time eaters (sense of perfectionism, directivity, conflict avoidance...).
Investing time in valuable activities.
Free your mind, reduce disturbances and set priorities.

FOSTER MOTIVATION

Distinguish the different Level of needs and the different sources of motivation.
Foster motivation through feed-back.
Make virtuous behaviors cascading the chain of command.
Assess your favorite managing style.
Identify managing needs (motivations, competences) and adjust managing style accordingly.

MANAGE ACROSS CULTURES

Discover Hofstede culture's dimensions (masculinity, power distance, uncertainty avoidance...) and assess the cultures you are dealing with.
Use Hofstede tool and adopt a managing posture to create bridges.

LEAD CHANGE & MANAGE CRISIS

Understand changes and crisis: stakes and perceptions.
Assess your team along the change management curve and help them to move away from resistance.
How to fight rumors and communicate during crisis and change.

MANAGING POSTURE, MINDSET & DECISION MAKING IN CHANGING ENVIRONMENT

Identify cognitive bias and boost reflexivity.
Make proper decision in uncertain environment.
Foster a culture of changes within the organization.

CONCLUSIONS

Wrap-up of the essentials of the course.
Personal action planning review and feed-back.

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Training - Oral Communication Techniques

SOFTINI-EN-P | Face-to-face only | 2 days

During this session, the participants will learn fundamentals of oral communication techniques

Level
Knowledge

Public
Technicians and engineers in the energy and process industries areas

Objectives
Attendees will be able to implement the following skills:

- Be heard and understood and hold the audience's attention
- Develop fluency in expression and overcome stage fright

Pedagogical & technical resources
Numerous role-play situations

Assessment of achievements
Role play

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

COMMUNICATION BASICS

Understanding communication stakes.

OVERCOMING ONE'S FEARS

Mastering stage-freight tools.
Giving lively speeches using emotions.
Being assertive.
Planning an structuring an oral presentation.
Making a public presentation.

UNDERSTANDING OTHERS

Taking in consideration one's audience's needs.
Listening actively.
Identifying differences in expressions.

AT EASE IN DIFFERENT SITUATIONS

Conducting a meeting.

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Participating actively in meetings.
Using collaborative tool².

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Training - Soft Skills for the Middle Managers

SOFTMID-EN-P | Face-to-face only | 5 days

During this session, the participants will learn fundamentals of team leading. Participants will also review some oral communication techniques.

Level
Skilled

Public
Middle managers of the energy and process industries areas

Objectives
Attendees will be able to implement the following skills:

- Self management: improve self-knowledge and develop assertiveness; manage emotion and prevent stress; develop fluency in expression and overcome stage fright
- Team management: improve oral communication skills, hold the audience's attention and strengthen their leadership; effectively manage and motivate people, facilitating team cohesion; regulate the team, prevent and manage conflicts; structure teamwork and meeting, solving problem as a team; mentor juniors and develop autonomy
- Middle management: ascendent communication (arbitrate and select facts and information to report properly to the team leader); descendent communication (represent and support the hierarchy and communicate decisions to the team, convey quantitative and technical objectives into motivating goals)

Pedagogical & technical resources

- Experiences sharing
- Exercises and role plays
- Definition of a personal action plan

Assessment of achievements

- Exercices observation by trainer and peers
- Action plan reviewed with the trainer

Prerequisites
Having managed a team for at least one month

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

COMMUNICATION BASICS

Communication scheme and channels.

DEVELOP DEEP LISTENING & EXPRESSION SKILLS

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Participant will work on an exercise to listen and introduce other participants on extra-curricula criteria. Each of them will assess others on their presentation skills.

BEHAVIOR STYLES & COMMUNICATION

Recognize behavior styles with colors method.
Identify their own behavior style.
Participant will work on an exercise to identify four main behavior styles and their combinations and will deduct their strength and weaknesses for their management.

EMOTIONS, STRESS MANAGEMENT & PUBLIC PRESENTATION

Roles of emotions and their consequences on the managing style.
Speaking up.
Making an effective speech.
Making a public presentation.
Overcoming one's fears workshop : Participant will deliver a speech on specific communication stress management technique they would like to share and get feedback.

BEING ASSERTIVE

Develop assertive communication.
Participant will self-assess their own assertiveness through a questionnaire and build an action plan to be-have more assertively.

REGULATE THE TEAM & PREVENT CONFLICT

Conflict steps and corresponding regulation methods, prevention.

PROVIDING FEED-BACK & STOPPING MISBEHAVIORS

Mastering a specific regulation tool: the DESC.
Participant will work on the "movie" of their own case to bring another scenario with the DESC method, talking in front of an audience. Each participant will assess the impact of others' DESC and will suggest improvements.

INTERMEDIATE MANAGEMENT & SITUATIONAL LEADERSHIP

Arbitrate and select facts and information to report properly to the team leader.
Represent and support the hierarchy and communicate decisions to the team. Convey quantitative and technical objectives into motivating goals.
Hersey & Blanchard situational leadership styles (directive, supportive, delegate...) to adapt behavior style to the requirement of the situation.
Identifying preferred managing style through co-development: Participant will assess their own managing style Thanks to their behavior style and their level of assertiveness, they will be able to bold their leadership and find strategies to curate the consequences of their weaknesses working as a group.

MENTORING, WORK ORGANIZATION & DELEGATION

Involve juniors and support their progression, delegate missions.
Participant will work on their tasks and assess collaborators according to their level of autonomy (compe-tence + motivation). Analyze and compose a mentoring, delegation or development plan, focusing on the ways to build trust.

CONDUCT EFFICIENT MEETING

Meeting techniques (preparation, leading, regulation, follow-up).
MEETING PRACTICE: Participant will organize a meeting to take action to help everyone perform in his management. They will have to manage time, take note, and commit to act.

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ROUND TABLE & ACTION PLANS VALIDATION

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Training - Gas Turbines

TAG-EN-P | Face-to-face only | 5 days

This course provides a good knowledge of gas turbine technology and enhance competency in the selection, operation and maintenance of gas turbines

Level
Expert

Public
Engineers and managers involved in gas turbine operation, maintenance, engineering and purchasing

Objectives
Attendees will be able to implement the following skills:

- Explain the operation and operation of gas turbines
- List the essential elements for the selection of a gas turbine according to the process and conditions at the operating site
- List potential gas turbine incidents

Pedagogical & technical resources

- Case studies of actual gas turbines
- Various illustrations of actual systems
- Interactive course
- Groupwork: overall study of a gas turbine

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GAS TURBINE EQUIPMENT — 2 days

Classification: typical cycles, heavy duty and aeroderivative designs, applications.
Presentation: main components. Standard and specific machines available.
Construction and design: compression, combustion, expansion. Rotor dynamics, coupling.
Auxiliary equipment:

- Internal cooling, lubrication, control system, safety devices.
- External auxiliaries: air inlet filters, exhaust stack.

PERFORMANCE — 1.5 days

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Thermodynamics: ideal and actual gas, behavior during compression and expansion, isentropic and polytropic processes.
Centrifugal and axial compression. Performance, stability and other limits.
Combustion operation. Influence of fuel type. Afterburning for cogeneration purposes. Low NOx designs.
Expansion: single or double shaft design operation. Performance influence of atmospheric conditions, fuel selection. API charts.
Available load characteristics: rotation speed, T3 firing temperature, IGV influences. Open cycle, combined cycle examples.
Case studies: actual performance vs. basic design; troubleshooting and solutions.

SELECTION — 0.5 day

Selection criteria according to availability, operational and maintenance requirements.
Bidding: significant information for data sheet definition.

OPERATION — 1 day

Start-up and shutdown operation: sequences and trips. Air filtering, lubrication and fuel systems operation.
Performance monitoring and mechanical operation. Maintenance during operation: compressor cleaning devices.
Maintenance objectives and scheduling: operation, load, fuel influences; inspection schedules.
Factors related to available load: rotation speed, T3, IGV. Typical approaches related to Brayton cycle, cogeneration, combined cycle.

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Training - Troubleshooting in the Oil and Gas Industry

TBS-EN-P | Face-to-face only | 3 days

This course provides a better understanding of what troubleshooting is and gives keys to solve basic troubleshooting cases on refining and petrochemical equipment and plants

Level

Skilled

Public

Engineers, senior operation personnel or technical supervisory staff interested in solving troubleshooting cases on refining and petrochemical plants

Objectives

Attendees will be able to implement the following skills:

- Troubleshoot main equipment problems: air cooler, distillation column, reactor, furnaces...
- Systematically use an easy-to-implement methodology of troubleshooting

Pedagogical & technical resources

- “Gamification”, quizzes and exercises
- Videos
- Interactive and realistic sessions of troubleshooting cases studies

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer, such as case studies per group
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners’ understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

TROUBLESHOOTING IN PRACTICE — 0.75 day

What is troubleshooting? Typical cases seen in refineries and petrochemical plants.
How to start with a troubleshooting case: main rules, laws, orders of magnitude often used during a troubleshooting exercise on site (mass and energy balances, pressure and pressure drop behavior, thermodynamical laws...).
Main onsite practical devices used in troubleshooting for temperature, pressure, flows measurements, chemical analysis, gamma scanning... - Advantages and drawbacks, precautions of uses.

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METHODOLOGY — 0.25 day

Overview of different methods used in troubleshooting: 5 Why, RCA, PDCA...
Presentation of an easy-to-implement method based on PDCA. This methodology will be use during all the training to solve the different troubleshooting exercises.
Exercises to implement the methodology on real cases studies.

TROUBLESHOOTING OF EQUIPMENT - CASES STUDIES — 2 days

Troubleshooting case study on industrial equipment.
The objective of these exercises is to list, per equipment, the main operating conditions, the main causes of malfunction or failure and the different solution to implement in order to solve the situation (PDCA Method).
Review of the main causes of malfunction of equipment (troubleshooting checklists):

- Heat exchangers (performances, velocity influence, potential problems, fouling and cleaning, water exchanger, tubes inserts types and influence...).
- Air cooler (optimization, potential problems, fouling and cleaning, fogging system).
- Furnace (combustion and yield, controls, fouling and cleaning, tubes coking...).
- Distillation column (tower tray: efficiency and flooding, commissioning...).
- Reactor (internals, catalysts: potential problems...).
- Vacuum system (functioning, potential problems...).
- Pumps and compressors.

Troubleshooting case study on industrial units.
The objective of these exercises is to summarize and practice all the elements discussed during the course.

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Training - Waste Water Treatment from Refinery and Petrochemical Units

TER-EN-P | **Face-to-face only** | **2 days**

This course provides a deeper knowledge of waste water treatment processes

Level

Skilled

Public

- Daily and shift staff in charge of operating waste water treatment units and networks
- Operators of waste units undergoing transformation to waste treatment units
- Laboratory, process, and project engineers and staff

Objectives

Attendees will be able to implement the following skills:

- Specify the regulatory criteria defining pollution in a receiving environment with regard to the various characteristics of the waste water encountered
- Identify the fundamental points of the operation and monitoring of pollution control equipment in relation to the physical and biological principles implemented

Pedagogical & technical resources

Equipment demos (material, pictures and videos)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

LOCAL & REGIONAL REGULATIONS — 0.25 day

Operating permit: structure, contents, key chapters, elaboration and updating process.
Waste water specifications. Penalties in case of violation (formal requirements, fines).

WASTE WATER CHARACTERISTICS — 0.5 day

Natural sources and components. Various uses of water in operating units. Effluent rejection points.

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Nature of water pollutants (hydrocarbons, acidity, suspended matters, phenols, sulfides, mercaptans).
Analytical methods used in the laboratory and through on-line analyzers. BOD, COD, TOC.
Pollution mechanisms, impact on environment (insoluble, organic carbon, eutrophization, sludge).
Measurement of pollution: pollutant concentrations, quantities by unit of time. Typicals.

PHYSICO-CHEMICAL WATER TREATMENT PROCESSES — 0.5 day

Process water stripping: typical process scheme, optimum operating conditions.
Settling of insoluble hydrocarbons and sludge. Settling velocity. Settler design types and improvements.
Dissolved air floatation: equipment, flocculation additives, additive mix and operating parameter optimization.
Filtration: various equipment, sand, active carbon beds, other filtration media.

BIOLOGICAL TREATMENT OF WASTE WATER — 0.5 day

Growth of bacteria colonies. Required feed and nutrients. Biofiltration of process water.
Biological treatment technology: bacteria filters, activated sludge basins. Operating conditions.

BIOLOGICAL SLUDGE TREATMENT — 0.25 day

Sludge physio-chemical properties
Thickening methods: settling, press filtration, flocculation-floatation, centrifugation.
Analytical test methods: dry matter, heat value, volatile fractions, heavy metals.
Treatment processes: digester, wet oxidation, thermal hydrolysis, incineration, smell control.

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Training - Liquid Transport by Pipeline

TLPIP-EN-P | Face-to-face only | 4 days

This training provides a deeper knowledge on flow purpose through pipelines, pumps and pumping stations operation, pipe operation optimization and management

Level
Skilled

Public
Technicians and Engineers involved in pipeline operation and/or management

Objectives
Attendees will be able to implement the following skills:

- List possible phenomena that can affect a pipeline
- Associating the phenomenon with the measures to be taken to counter it
- List the parameters concerning the centrifugal pumps ensuring their adaptation to the stresses of the circuit
- List key points for pipeline optimization, maintenance, and safety

Pedagogical & technical resources
Case studies based on industrial situations

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

PIPELINE OPERATION — 0.5 day

Flow characteristics: flowrate, velocity, mass flow and volume flow, link between pressure and height, product viscosity, friction losses.
Piezometric line, practical use.
Circuit resistance.

CENTRIFUGAL PUMPS — 0.5 day

Technology. Various parts, seals, lubrication.
Survey - Potential damages and incidents.

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Pump types used with pipeline transfer. Variable speed drive.
Pump operation. Performance curves: head-flowrate, power, NPSH, efficiency.
Performances vs rotation speed and impeller diameter change.
Operation limits: minimum and maximum flows.

PIPELINE OPERATION — 1.5 days

Operating point, flow control.
Pump arrangements selection and optimization according to the pipeline characteristics.
Start-up, shutdown, incidents.
Liquid hammer effects.

OPERATION OF EQUIPMENT OTHER THAN PUMPS — 0.5 day

Pipeline fittings: valves types, check valves, pigs, pig stations.
Instrumentation and metering: hydrometers, flowmeters, colorimeters, turbines, metering stations.
Drag reducers: different types, use, properties, implementation.

PIPELINE MAINTENANCE — 0.5 day

Key points.

CONTAMINATION - CONTAMINANTS TREATMENT — 0.5 day

Products segregation. Contaminants management. Product quality issues, customer specifications issues.

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Training - Train the Trainers

TRAIN-EN-P | Face-to-face only | 5 days

Learn how to effectively train technicians in operating facilities

Level
Skilled

Public
Personnel in charge of training and technical competency enhancement programs

Objectives
Attendees will be able to implement the following skills:

- Specify the elements of preparation and planning of a training program for a new technician
- List the different types of knowledge to be brought to newcomers, in the classroom and in the field
- List the main tools for measuring learning that can be implemented

Pedagogical & technical resources

- Participants are required to practice all the concepts (workshops, exercises, field games)
- Case studies in class and on the field, some participants playing the role of trainees

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including short training presentations given by each participant as part of the chapter "Application to Operational Training in plants"

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

EFFECTIVE CLASSROOM TRAINING PRESENTATION — 1 day

The classroom environment: guidance on how to form groups, optimize room set-up, use training aids and media.
Agenda and organization of training courses. Strategies to motivate adult participants (influential factors).
Speech management: schedule, importance of time and repetition, open and closed questions.
How to encourage trainee active participation. Coping with difficult situations (hostility, stress, conflict).
How to finishing the presentation effectively (key-point participative review).

- Applications: ice-breaking game, perform a technical presentation.

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TEACHING TECHNIQUES — 1 day

The communication process and communicating in a teaching situation.
Transmission of information (distortion of information, loss of information from the sender to the receiver).
Characteristics of adult mentality (motivation, resistance to change, curiosity).
Teaching styles, methods and climate (influence on trainees' behavior).

- Applications: welcome a newcomer, perform a shift relief.

DESIGNING & STRUCTURING A TRAINING PROGRAM — 1 day

Preparing a training program (what, who, where, when and how), from simple to complex ones.
Training planning (well prepared and flexible). Training supports (manuals, textbooks, presentations, exercises).
Definition of learning objectives, verification of their achievement (types of evaluation, timing, frequency).
Use of visual and audiovisual aids, of physical equipment, of field visits.

- Applications: build an operator training program, create an exam.

APPLICATION TO INDUSTRIAL TRAINING IN THE PLANT — 2 days

Training on actual plant documents: P&IDs, operating procedures, equipment drawing, control loop.
Training on the field: equipment understanding and monitoring, safety assessment.
Use of major industrial incident reports for training and sensitization purposes.
Short training presentations by participants, feedback lessons with the complete group.

- Applications: create and discuss operating procedures, field training on pumps, use of accident reports for training.

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Training - Improving trainer's skills

TRAINERS-EN-P | **Face-to-face only** | **20 days**

Provide participants with the methods and tools required to effectively train technicians in operating facilities

Level

Knowledge

Public

Personnel in charge of training and technical competency enhancement programs

Objectives

Attendees will be able to implement the following skills:

- Upon completion of this program, participants will be able to
- Design structured technical training programs adapted to industrial operational contexts.
- Define clear learning objectives and appropriate training activities for technicians and operators.
- Deliver effective training sessions using appropriate teaching techniques and communication strategies.
- Supervise field training activities such as Practical Exercises (PE), On Job Orientation (OJO) and On Job Training (OJT).
- Evaluate trainee performance in operational training situations.

Pedagogical & technical resources

- Participants are required to practice all the concepts (workshops, exercises, field games)
- Case studies in class and on the field, some participants playing the role of trainees

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

WEEK 1 - FOUNDATIONS OF TECHNICAL TRAINING AND COMMUNICATION

THE ROLE OF THE TECHNICAL TRAINER — 1 day

Responsibilities of trainers in industrial training programs.

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Knowledge transfer in operational environments.
Challenges of training experienced technicians.

COMMUNICATION AND INTERPERSONAL SKILLS — 1 day

Communication processes and barriers.
Active listening techniques.
Questioning strategies.
Managing difficult interactions during training.

TEAM DYNAMICS AND LEARNING CLIMATE — 1 day

Building trust and psychological safety.
Encouraging participation.
Managing group dynamics in training sessions.

INTRODUCTION TO PEDAGOGICAL ENGINEERING — 2 days

Differences between objectives, content and activities.
Structure of a training sequence.
Learning progression: from simple to complex.

WEEK 2 - DESIGNING EFFECTIVE TECHNICAL TRAINING

TRAINING NEEDS ANALYSIS — 0.75 day

Identifying competency gaps.
Linking operational tasks and training objectives..

LEARNING OBJECTIVES AND TRAINING STRUCTURE — 0.75 day

Writing measurable learning objectives.
Structuring learning progression..

TRAINING PLANNING — 1 day

Organizing training sessions.
Time management in training delivery.

TEACHING METHODS AND LEARNING ACTIVITIES — 1 day

Demonstrations.
Guided practice.
Problem-based learning.
Case studies.

TRAINING MATERIALS — 0.75 day

Training manuals.
Technical presentations.
Exercises and practical activities.

TEACHING TECHNIQUES — 0.5 day

Questioning techniques.
Encouraging trainee participation.
Checking trainee understanding.

TRAINING PLAN PRESENTATION — 0.25 day

Participants design and present a training module.
Peer evaluation and trainer feedback are conducted.

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WEEK 3 - FIELD TRAINING METHODS

FIELD OPERATOR TRAINING PHILOSOPHY — 0.75 day

Principles of operational training.
Learning through real operational situations.

PRACTICAL EXERCISE (PE) — 1.25 days

Design of practical training scenarios.
Preparation of equipment and safety conditions.
Supervision of trainees during exercises.
Debriefing techniques.

TECHNICAL REINFORCEMENT (OIL & GAS EQUIPMENT) — 1 day

Key equipment used in operating facilities.
Basic operating principles.
Safety considerations during technical training.

ON JOB ORIENTATION (OJO) — 1 day

Introducing trainees to operational environments.
Structured observation activities.
Safety supervision.

ON JOB TRAINING (OJT) — 1 day

Learning by performing operational tasks.
Coaching during real work situations.
Performance evaluation.

WEEK 4 - ADVANCED OPERATIONAL TRAINING AND TROUBLESHOOTING

TROUBLESHOOTING TRAINING — 1 day

Understanding process deviations.
Diagnostic reasoning.
Decision-making under operational constraints.

PEDAGOGICAL PLANT ACTIVITIES — 1.25 days

Equipment operation principles.
Dynamic plant loops.
Practical troubleshooting exercises.

OPERATOR TRAINING SIMULATOR (OTS) — 1 day

Simulator training philosophy.
Training on process disturbances.
Scenario-based learning.

HSE TRAINING SCENARIOS — 0.75 day

Safety practices during operations.
Maintenance activities in safe conditions.
Safety audits and risk awareness.

INTEGRATED TRAINING WORKSHOP — 1 day

Participants design and deliver a complete training scenario integrating:

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- Operational troubleshooting.
- Safety constraints.
- Technical decision-making.

Final group debriefing and trainer evaluation.

Sessions

La Mède - From 10/12/2026 to 11/06/2026 **19750 €/HT**

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Training - Toolbox for Mentors and Apprenticeship Supervisors

TUTBO-EN-P | **Face-to-face only** | **2 days**

This course provides help to mentors in order to fulfill their mission in the operator training program

Level
Skilled

Public
Mentors in charge of training field operators onsite

Objectives
Attendees will be able to implement the following skills:

- List the various information to be communicated to the participants of a work-study program
- Specify the methods of feedback to the participants and other people involved in the client as well as, internally, those of the training organization

Pedagogical & technical resources

- Role playing, putting the new trainers in various training situations on an industrial site
- Extensive group discussions
- Training situations based on actual incident reports

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including role playing situation assessment

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GENERAL OBJECTIVES OF OPERATOR TRAINING — 0.25 day

Field Operator Certification program organization.
Teaching method and knowledge assessment.
Conditions for granting the certification.

TRAINING ORGANIZATION & RELATIONSHIPS — 0.25 day

Training book: a standardized document to improve trainee follow-up and communication with trainers.

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Synchronization of the topics seen in class with working practice. Mentors/trainers meetings in the field.
Mentors' missions (integration, on-the-job practical training, verification of acquired knowledge).
Final briefing and participation to the final board of examiners.

MENTOR'S TOOL BOX — 1 day

Teaching know-how:

- Communication techniques, questioning, listening, observing, reformulating, development.
- Assessment techniques: assessment preparation by the mentor, running the assessment meeting.
- What approach to adopt when a trainee is unsuccessful.

Technical knowledge:

- From a real company situation, how to develop training exercises.
- Learning the installation during interventions, detecting and using interesting situations for training.
- Accepting one's limitations; developing strategies to retrieve information.

PRACTICAL APPLICATION: OPERATOR'S INSPECTION ROUTINE CHECKS — 0.5 day

From a video shot or on a plant in the field: case study and mentor's experience.
Observation of the sequence by the participants to make comments and suggest improvements.

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Training - Utilities - Environment Management

UTILENV-EN-P | Face-to-face only | 5 days

Utility production processes and equipment (water, steam, electrical power, air) Management of environmental issues (air, water, waste, management system)

Level

Knowledge

Public

Engineers and supervisors from operations and technology departments of Refining/Petrochemical sites

Objectives

Attendees will be able to implement the following skills:

- List the design and optimization criteria of a utility production scheme (steam, electricity, water, air) with regard to environmental constraints
- Identify operational optimization points for utility units and networks, taking into account environmental constraints

Pedagogical & technical resources

- Videos to demonstrate the implementation of the various technologies
- Practical exercises on the design and/or operation of each utility
- Actual case studies, learning games and quizzes to test participants' learning

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BFW QUALITY - STEAM PRODUCTION — 1 day

Boiler feed water quality, drawbacks resulting from impurities. Production of boiler feed water. Condensate recovery. Steam pressure levels, user types, network control, turbines, static expansions. Water-tube boiler: water and steam circuits, air and stack (equipment and control). Other boiler types.

ELECTRICAL POWER PRODUCTION & SUPPLY — 0.5 day

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Quality requirements: power and voltage. Production: generators, gas turbines, cogeneration.
Electrical network: key-equipment, transducers, grounding, back-up supply, safety and reliability.

COMPRESSED AIR GASES — 0.5 day

Process requirements and reasons, air supply criticality. Instrument air: compressors, dryers.
Network, back-up supply. Nitrogen production: design, uses and risks. Uses and risks of O2 and CO2.

INDUSTRIAL WATER NETWORKS — 1 day

Cooling water networks (open, closed, semi-open). Use of sea water, design and operations.
Cooling tower design: key parameters, sizing rules, prevention of operational concerns.
Fire fighting water network: key design elements, main equipment, good practices.

AIR POLLUTION MECHANISMS & PREVENTION — 1 day

Main atmospheric pollutants (CO2, SOx, NOx, VOC). Environmental impacts (global warming, acid rains, ozone).
Measurement of atmospheric pollution, reaction procedures.
Main sources of pollution. Prevention methods: combustion and storage equipment.
Vapor recovery units. Sensitization. Flare systems. Vent and drain networks.

WATER POLLUTION & WASTE WATER TREATMENT — 0.5 day

Pollution sources in refining. Waste water effluent typical specifications. Quality control.
Treatment of oily water (settling, floatation, biological) and process water. Finishing options.

ENVIRONMENTAL MANAGEMENT SYSTEM — 0.5 day

Other pollution mechanisms: soil, solid waste, noise, smells. Prevention and remediation.
Importance of environmental regulations. Environmental impact assessment. ISO 14001 standard.

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This training course is offered under the **Alliance4Training** brand

Training - Hydrogen Production Unit

VAPOREF-EN-P | **Face-to-face only** | **2 days**

This course provides a deeper understanding of the operating and monitoring of steam reformers

Level
Skilled

Public
Engineers, supervisors and staff interested or involved in the operation of a SMR unit

Objectives
Attendees will be able to implement the following skills:
- Describe the steps of the process

Pedagogical & technical resources
- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Case studies handled in groups, based on typical situations of the sections studied
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis

Assessment of achievements
- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ANALYSIS OF SMR OPERATING CONDITIONS — 1 day

Main hydrogen manufacturing processes.
Objective of the successive steps: desulfurization, steam reforming, CO shift, hydrogen purification.
Process flow scheme.
Material balance, conversion, yields at various steps.
Feedstock and product quality: natural gas, demineralized water, hydrogen quality.
Operating conditions and control loops.
Characteristics of the chemical reactions involved: thermodynamic and kinetic aspects, their consequences on the operation, side reactions and optimum operating conditions to limit their evolution.
Role and mechanism of a catalyst: chemical and physical characteristics, effect of poisoning and ageing.

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Influence of operating conditions on hydrogen production and on downstream steps.
Hydrogen purification:

- Adsorption (PSA) and methanation: comparison of performances.
- Influence of operating parameters on hydrogen purity, CO2 absorption and amine regeneration.
- PSA unit characteristics and operation.

STEAM REFORMER FURNACE OPERATION 0.5 day

Different types of furnaces: technology, furnace efficiency, operating parameters, control and safety loops.
Catalyst loading procedure.
Behavior of the tube bundle. Mechanical and thermal stress.
Routine operation and main operating constraints.

STEAM PRODUCTION 0.25 day

Water preparation: drawbacks arising from impurities in water, water quality measurement, characteristics of feed water, thermal degassing, chemical conditioning of water.

OPERATION & START-UP - DISTURBANCES & TROUBLESHOOTING 0.25 day

Key operating parameters and overall process optimization, interactions between process steps, catalyst cycles management.
Principles of start-up procedure: preparation, ignition, temperature build-up, feed in.
Disturbances: modification of the steam/HC ratio, decrease of feed flowrate, change in feed composition.
Incidents: pretreatment reactor runaway, tube rupture in the furnace, absorption section bypassing.

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