## Recent Developments in Oil Refining Technologies

**Overview**

**LEVEL**
Expert

**PURPOSE**
This course provides an up-to-date information on present and future trends of oil refining processes.

**LEARNING OBJECTIVES**
Upon completion of the course, participants will be able to:
- get a broad vision of future from technical, safety and environmental constraints for the refining industry,
- quote the recent developments in oil refining processes,
- explain how the latest breakthroughs can help meet the new challenges.

**WAYS AND MEANS**
Each single topic is covered by a world-class expert in the field.

**LEARNING ASSESSMENT**
Quiz.

**PREREQUISITES**
To fulfill at least one of the following criteria:
- to have a Master degree or equivalent in process, engineering, industrial chemistry,
- or to have knowledge in refining processes or to have more than 3 years' proven technical experience in the refining industry.

**MORE INFO**
The participation of many experts from IFP Energies nouvelles, Axens and Technip requires organizing the training session in IFP Training facilities near Paris - France. A part of the program can be delivered outside France if you need it.

### Agenda

**REFINERY PRODUCTS & PROCESS EVOLUTION OUTLOOK FOR 2020**
- Recent trends and new constraints reshaping the environment of the refining activity on various regions around the world.
- Quality requirements and desulfurization.
- New and future regulations concerning emissions: SO\(_x\), CO\(_2\), NO\(_x\), COV’s.
- Evolution of the refining process flow diagram: hydrogen addition or carbon removal, trends to petrochemical tendencies.

**ATMOSPHERIC & VACUUM DISTILLATION: NEW CONCEPTS**
- Progressive distillation, concept and example.
- Heat recovery optimization and energy consumption.
- Modern internals for crude oil distillation column.
Efficient and low energy consumption vacuum equipment.

**CATALYTIC REFORMING & ISOMERIZATION**
- Fixed bed reforming debottlenecking options.
- Continuous catalytic reforming: concept, comparison with “semi reg” units.
- Benzene separation, paraxylene production and purification.
- Advanced isomerization technology for recycling paraffins.
- New breakthroughs in catalytic fields.

**FCC: MORE PROPYLENE OR MORE LCO**
- Feed injection and temperature control of the mixture.
- Riser termination devices and catalyst separation. Post riser quench.
- Stripping technology.
- Regeneration and catalyst coolers.
- Propylene yield enhancement.
- Reduction of SO, and NO, emissions.

**GASOLINE & SULFUR REDUCTION STRATEGIES**
- Sulfur distribution in FCC gasoline and selective HDS.
- Alternate sources of gasoline:
  - Light olefins oligomerization.
- New trends in alkylation.

**ULTRA - LOW SULFUR DIESEL PRODUCTION & VGO DEEP HYDROTREATMENT**
- New generation catalysts and their performance.
- Diesel hydrotreater units: investigation of new and existing means of achieving ULSD.
- FCC feed pretreatment.

**HYDROCRACKING FOR VACUUM DISTILLATES & RESIDUES**
- High pressure hydrocracking, mild hydrocracking.
- Recent technologies: catalysts, energy recovery, fractionation.
- Various technologies available: fixed bed, ebullient bed, moving bed.

**HYDROGEN BALANCE**
- Routes for hydrogen production (steam methane reforming, partial oxidation).
- Management of hydrogen network and optimization.

**THERMAL CONVERSION OF RESIDUES**
- Renewal of an old process: delayed coker and residue destruction.
- Purification of the products and hydrogen consumption.
- Integration into the framework of crude upgrading.

**CRITICITY OF SULFUR UNITS**
- Sulfur plants: efficiency of different arrangements, reliability in the refining operation, solid sulfur production.
- Tail gas treatments: comparison of different processes and performances.