Advance Hydro-Treating and Reforming Process

Course Overview

What is the hydrotreating process in a petroleum refinery?

Crude oil refining essentially consists of separation stages that produce valuable products. Consequently, the main challenge during crude oil refining is to manage the multicomponent feed and product streams. Therefore, the first step in understanding these processes is to gather knowledge about the characterization of these multi-component feeds, intermediates, and product streams.

What is the purpose of hydrotreating?

Generally, the crude oil is refined, consists of gases, light/heavy naphtha, kerosene, light gas oil, heavy gas oil, and residue. This complex mixture ultimately gets separated and broken down into valuable product streams like fuel gas, liquefied petroleum gas, gasoline, jet fuel, kerosene, auto diesel, lubricants, etc. The essence of all refining processes is to carefully tune the feed properties by utilizing both chemical and physical changes. Usually sulphur content in the majority of crudes is considerably high.

Hence, the product streams of crude distillation and vacuum distillation units contain substantial quantities of sulphur. The commonly employed method of sulphur removal involves desulphurization by converting sulphur into hydrogen sulphide with the help of hydrogen. For that reason, the desulphurization process is carried out by hydrogen-based processes. The main processes include hydrotreating and hydrocracking.

This training course will give you comprehensive Hydrotreating & Hydrocracking Process Technology training. The course is developed to cover the basic knowledge, as well as, the advanced concepts of hydrotreating and hydrocracking.

Course Objectives

The main objectives of this course are as follows:

- Grasp the essence of hydrotreatment processes
- Develop a deep understanding of mass/hydrogen/energy balance in refining processes
- Gain in-depth knowledge of the state-of-the-art of material and energy integration in hydro processing
- Evaluate various flow schemes for both, hydrotreating & hydrocracking
- Adjust operational and design parameters to achieve enhanced hydrogen conversion
- Enhance knowledge of the underlying chemistry, reaction kinetics, catalysis, green production, and ecological challenges of hydro processes
- Analyse optimization of hydrotreatment units and their operation
- Detect potential deficiencies by troubleshooting

Who Should Attend?

- Process and development engineers
- Plant managers
- Operational engineers / control engineers
- Technicians from the refining industry
- Refining Industry – designers & researchers
- The personnel from other walks of life who are eager to gain information about the hydro-conversion processes
- The course is equally suitable for both experts and beginners

Course Outlines

Day 1: Introduction & The Basics (Module 1 & Module 2)

Introduction

- Impurities in petroleum cuts and products
- Impact of petroleum impurities on health, environment and on other refining processes
- Recent regulations and future trends
- Quality standards of refining product stream in terms of permissible impurities

The Basics

- Basics of material, energy interaction, and hydrogen balance in refining processes
- State-of-the-Art of Material and Energy Integration
- Basics of crude refining processes
- Products' Specifications and Characteristics
- Process Design/Optimization and Heat Integration Schemes
- Environmental and Economic Issues

Day 2: Hydrotreatment – Fundamentals and Principles & Hydrotreatment – Advanced Processing (Module 3 & Module 4)

Hydrotreatment – Fundamentals and Principles

- Basics of hydro conversion processes and hydrogen generation
- Process Flow Schemes
- Process Chemistry and Kinetics
- Catalysis
- Operating Conditions, Principles, and Design Considerations
- Hydrogen Requirements for Hydrotreatment

Hydrotreatment – Advanced Processing

- Reactors Design
- Atmospheric Residue Desulphurization
- Saturation of Benzene in Gasoline
- Possible process optimization for cost-saving in terms of raw material and energy utilization

Day 3: Hydrocracking – Fundamentals and Principles   & Hydrocracking – Advanced Processing (Module 5 & Module 6)

Hydrocracking - Fundamentals and Principles

- Feed Stocks and Products
- Process Chemistry/Kinetics
- Catalysts/De-activation and Re-Generation
- Quality of product stream and conversion
- Process layout, catalysis, process parameters
- Reactors Technology for Hydrocracking
- Single Stage Hydrocracking Process Technology

Hydrocracking – Advanced Processing

- Two-Stage Hydrocracking Process Technology
- Process Design Features
- Hydrogen Balance and Consumption
- Scope for Process Integration Improvements
- Hydrogen Balance/Integration and Management
- Steam/Methane Reforming

Day 4: Commercial Considerations in Hydro processing & Commercial Hydrocracking (Module 7 & Module 8)

Commercial Considerations in Hydro processing

- Classification and characteristics
- Catalyst pre sulphhiding
- Catalyst deactivation and regeneration
- Process design/mechanical design features

Commercial Hydrocracking

- GC sampling
- Hydrocracking feedstock
- Pre-treatment considerations
- Review of hydrocracking reactions/heats of reaction
- Hydrocracking process configurations
- Reactor design
- Process variables and catalysts
- Catalyst deactivation and regeneration
- Hydrocracking yields and product properties

Day 5: Hydro processing Mechanical Considerations & Troubleshooting & Hydro processing Mechanical Considerations & Troubleshooting (Module 9 & Module 10)

Hydro processing Mechanical Considerations & Troubleshooting

- Design principles
- Common problem areas
- Safety issues

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Training Course Price:

Number of Participants	Course Price
1 Participant	KWD 1650.000
2 Participants	KWD 1600.000
3 Participants	KWD 1550.000
4 Participants	KWD 1500.000
5 Participants	KWD 1450.000
6 and above Participants	KWD 1400.000

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