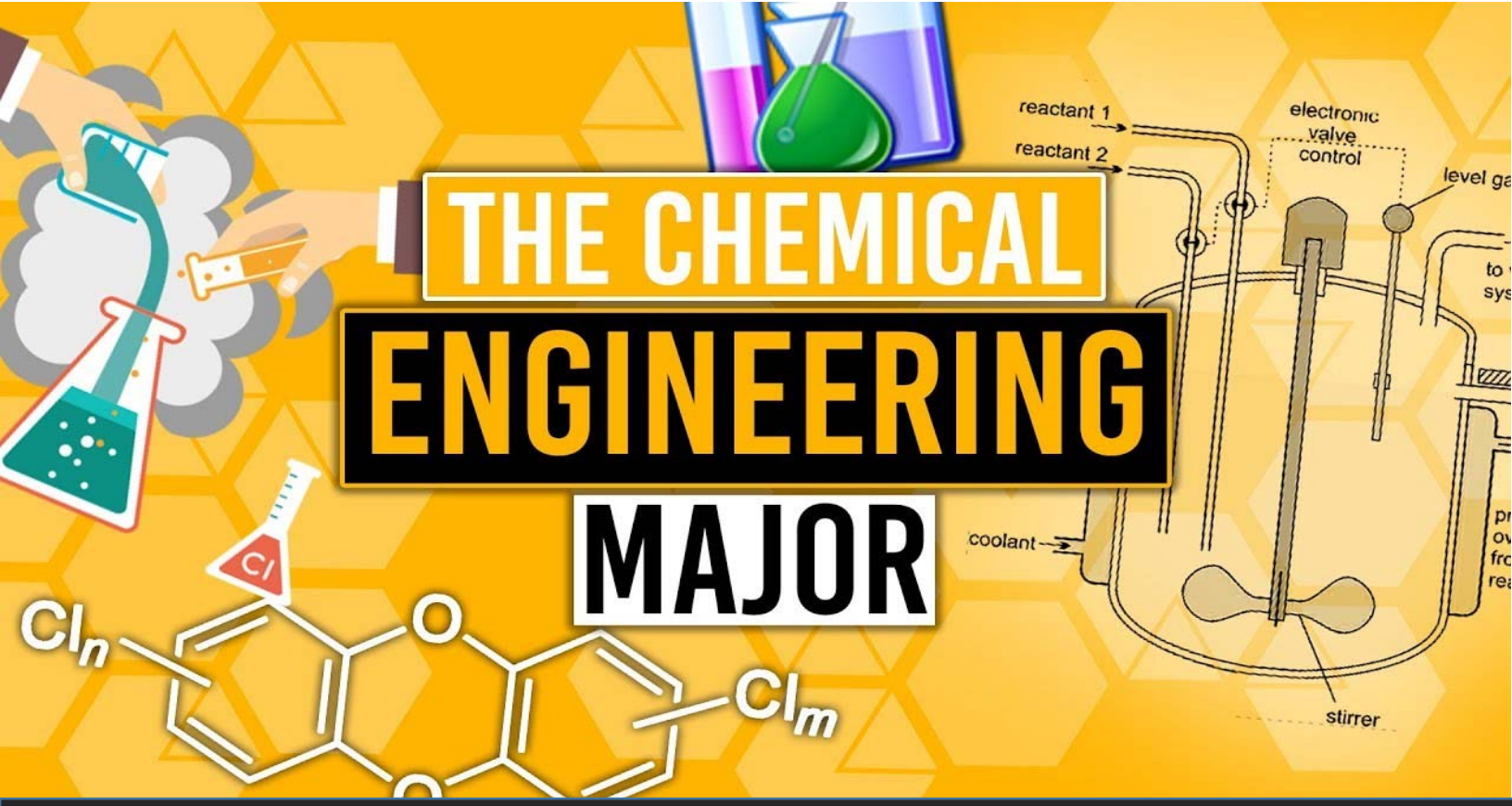


# Hydrotreating & Hydrocracking Process Technology

BTS
Training & Consultancy

# Hydrotreating & Hydrocracking Process Technology

## Introduction

This comprehensive Hydrotreating & Hydrocracking Process Technology training course overlays the process fundamentals and sound knowledge of Hydrotreating and Hydrocracking processes where Hydrogen is a key material in the upgrading and treatment of refinery products and fractions. A review of the state-of-the-art in process design, energy and mass integration will be presented as potential key improvements.

In-depth practical review of Hydrotreating/cracking technologies is provided across the course topics. The contents focus on the Hydro-conversion of heavy products, distillates, diesel, and naphtha into other hydrogenated/lower molecular weight products, besides saturated products with enhanced Cetane number, free of sulphur, nitrogen and metals. The course also discusses some process design/chemistry and engineering principles for such processes and presents scope for improvements.

This BTS course is valuable to engineers/scientists, designers and researchers involved in the industry of Hydro-conversion in refiners. Yet it is most beneficial to those professionals with experiences in other fields and willing to acquire knowledge in Hydro-conversion processes.

**This training course will feature:**

- Lectures, exercises and team work in some areas of process design and improvement
- Real studies that exhibit improvement solution for energy/environment
- Knowledge transfer of instructor's extensive engaged industrial consultations
- Practice of Excel-based design tools for mass/energy integration in refining plants
- Open discussion on actual problems/data for design and improvements

# Training Objectives
# What are the Goals?

**By the end of this training course, participants will be able to:**

- Develop deep understanding of mass/H2/energy balance in refining processes
- Gain in-depth knowledge of the state-of-the-art of material and energy integration
- Evaluate different flow schemes for hydrotreating and hydrocracking processes
- Manipulated process design and operation variables for better H2-conversion performances
- Master experiences of chemistry/kinetics, function of catalysts, clean production, environmental issues of very typical upgraded fuel productions

# Target Audience

# Who is this Training Course for?

The BTS course is of great significance to process/operational engineers, technicians, control engineers, designers, scientists and researchers working closely in the refining industry in general or particularly Hydrocracking, Hydrotreating processes. It is also substantially beneficial to other professionals and experts who have considerable experiences in other fields of business and keen to gain a sufficient knowledge in the particular industry of Hydro-conversion. All levels of professionalism are eligible for the course, ranging from young-fresh personnel to highly experienced ones.

**This training course is suitable to a wide range of professionals but will greatly benefit:**

- Process and development engineers
- Plant managers
- Operational engineers/control personnel
- Researchers/scientists
- Project and design engineers

# Training Methods

# How will this Training Course be Presented?

This training course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This includes course materials, proposed reading/state-of-the-art of the course content, lecture talks, exercises, team works and discussions, and solved applications. The nature of the course will be interactive and a practice of how to think, not what to think will be mastered. The philosophy of the course delivery will be:

- Development of a deep understanding of the-state-of-the-art of all contents and topics
- Analysis and improvement of some case studies with respect to economics and environment
- Practices in process design/simulation of specific applications based on Excel or commercial packages if available

# Daily Agenda

## Day One: Introduction: The Basics

- Fundamentals of Mass/Hydrogen and Energy Balance in Refineries
- State-of-the-Art of Material and Energy Integration
- Fundamentals of Petroleum Refinery Processing: Downstream Crude Oil Refining
- Products' Specifications and Characteristics
- Process Design/Optimisation and Heat Integration Schemes
- Environmental and Economic Issues

## Day Two: HydroTreating – Fundamentals and Principles

- Introduction to Hydro-Conversion Processes and H2 Sources
- Process Flow Schemes
- Process Chemistry and Kinetics
- Catalysts/ Heat of Reactions
- Operating Conditions, Principles and Design Considerations
- Hydrogen Requirements for Hydrotreating

## Day Three: HydroTreating – Advanced Processing

- Reactors Design
- Applications to Naphtha, Middle Distillate, Gas Oil and
- Atmospheric Residue Desulphurisation
- Saturation of Benzene in Gasoline
- Potential Improvements for Material and Energy Savings
- Clean Diesel Hydrotreating Process Technology – Critical Issues

## Day Four: Hydrocracking – Fundamentals and Principles

- Feed Stocks and Products
- Process Chemistry/Kinetics
- Catalysts/De-activation and Re-Generation
- Products Quality and Yields: Process Configuration, Catalyst Type and Operating Process Variables and Parameters
- Reactors Technology for Hydrocracking
- Single Stage Hydrocracking Process Technology

## Day Five: 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