UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Fundamentals of Industrial Chemical Technologies

2223-3-E2702Q109

Learning area

science of chemical processes and technologies

Learning objectives

Give the tools to understand the motivations for the technologies adopted and the plant choices in the chemical industry. Provide the elements for the sizing of the solutions identified. Propose a course of study, through the subjects covered, which shows the interdisciplinarity of the choices that the graduate in Chemical Sciences and Technologies daily has to face in the exercise of their functions.

To consolidate the relationship between the University and industry structurally complementary for intellectual and industrial development.

Contents

Oil (hints) and refinery structure, main chemical processes of the Petroleum industry

Formulations of automotive fuels

Petrochemicals, references to polymers, polyethylene, polypropylene, polyesters and polycarbonates and industrial applications

Thermal and energy diagrams and balance sheets

Transport phenomena (mass and energy transfer) heat exchange and fluid dynamics

Detailed program

Characterization of oil, valorization of crude oil, definition of refinery margin, netback of crude oil, variables that influence the price of oil.

Configuration of refineries, high conversion refineries, fuel formulation and their commercial specifications. Petroleum products.

Primary distillation of crude, vacuum distillation, desulphurisation, hydrocracking, thermal cracking (visbreacking, coker), catalytic cracking (FCC), alkylation, etherification, reforming, residual gasification, production of first, second and new generation biofuels.

Schemes and balance of matter and energy, purging and recycling in industrial chemistry

Petrochemistry, Francis diagram, steam-forming, aromatic production, physical separation or, m, p xylene, ethylene, propylene, polyethylene, polypropylene, polyethylene terephthalate, polycarbonate .Catalyse Ziegler Natta, metallocene catalysts

Liquid vapor equilibrium, distillation of straight grinding lines and determination of the number of theoretical plates of a column, Flash operation, heat exchange, equi / counter-current exchangers, condensers, fluid dynamics, Bernoulli equation, Reynolds number, fluid motion through solid masses (fluid and fixed bed), pressure drops, pumps (NPSH, head, absorbed power) compressors

Prerequisites

Fundamentals of thermodynamics of chemical equilibria, organic chemistry, catalysis and chemical kinetics

Teaching methods

Theoretical lectures with explanations on the blackboard and use of slides, in-depth studies with complementary notions during the exercises activities

Assessment methods

Written and oral exam.

The short written test (max 20 ') serves as admission for the next oral exam.

Required skills: ability to re-elaborate the concepts acquired in the classroom in the field of problem solving; resolution of short quali-quantitative questions in the industrial field. Clear presentation of the concepts learned during the course.

Textbooks and Reading Materials

Jacobs A. Moulijn,Michiel Makkee,Annelies Van Diepen

Chemical Process Technology

Ed Wiley

Carlo Giavarini

Guida allo studio dei processi di raffinazione e petrolchimica

Ed Efesto

Forni Rossetti

fenomeni di trasporto

Ed Cortina Milano

Gian Berto Guarise

Lezioni di impianti chimici

Ed Cleup

Natoli Calatozzolo

Tecnologie chimiche industriali

Ed Edisco

F.Di Benedetto

Oil and Bio trading

Ed FrancoAngeli

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE