Refinery

Calendar: 4th day semester

Contact Hours: TP 60,0h, OT 15,0h

Scientific Area: Processes in Chemical and Biological Engineering

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

The purpose of this curricular unit is that students should acquire skills with respect to the processes and major operations in refining, understanding the evolution of the processes involved over the decades which allow them to acquire a rigorous view on the future of this industry. Students should recognize the most suitable processes for refining and treatment of various raw materials, as well as how to obtain the required final products and improving those processes. From these it can be highlight the conversion processes (decomposition, synthesis, reforming), as well as the Fractioning processes.

Syllabus:

1. Introduction
2. Pre-treatments and fractionation processes
3. Conversion processes: Decomposition – Thermal Cracking; Catalytic Cracking; Hidrocracking; Hydrogen production
4. Conversion processes: Unification – Desulfurization; alkylation; Polymerization
5. Conversion processes: Alteration and rearrangement - Reforming; Isomerisation
6. Treatment processes: Amine treatment; Drying; hydrodesulfurization; hydrotreating; Solvent treatment
7. Other processes in the refinery

Evidence of the syllabus coherence with the curricular unit's intended learning outcomes:

In the curricular unit about the Refinery the primary objective is that students acquire skills related with the most important processes on storing and processing in the petroleum refinery. This vision on the phenomena and their evolution is taught thoughout all chapters. Thus, chapter nº 1 consists of a brief introduction to this subject, then the chapter on the pre-treatment and packaging of raw materials associated with the essential process of fractionation is lectured. Afterword it teaches some of the conversion processes are taught in some detail (Chapters 3 to 5). These chapters' starts with the most relevant decomposition processes, followed by the unification process, which is used to obtain products of longer chain. Finally, the processes of rearrangement and change is lectured. Chapter nº 6 refers to final treatments with are used to improve the final products, such as removal of amines to control acidity, water removal, etc. Finally, in the final chapter other processes of interest are referred.

References:

1. Robert A. Meyer, Handbook of Petroleum Refinning Process (3rd edition), McGraw Hill, 2004

2. H.K. Abdel-Aal, Nohamed Aggour, M.A. Fahim, Petroleum and Gas Field Process, Marcel Decker, 2003

3. Robert E. Maples, Petroleum Refinery Process Economics (2nd Edition), PennWell Corp., 2000

4. Ozrem Ocic, Oil Refineries in the 21st century, Jphn Willey, 2005