Petrochemical Products Transformation

Calendar: 5th day semester

Contact Hours: T 37,5h; PL 30,0h; OT 7,5h

Scientific Area: Processes in Chemical and Biological Engineering

Learning outcomes of the curricular unit:

The objective of the course is the acquisition of knowledge in the final products of the refinery as well as transformations and applications of them, integrated in the refinery itself or in downstream industries. Training on the production of bitumen, lubricants, final composition of fuels. It is also intended that students acquire the basics of fine chemicals and polymerization.

Syllabus:

1 Monomers and chemicals manufacturing base

1.1 Description and characterization of secondary products of the refinery

1.2 Production of Aromatic

2 Bitumen

2.1 Types and characteristics

3 Production of lubricants

3.1 Types of lubricants: mixtures and additives

3.2 Specifications and characterization

4 Fine Chemistry

4.1 The industry of fine chemicals. Size and market structure, general trends, growth and globalization.

4.2 Applications of petroleum in the fine chemical industry in the production of pharmaceuticals, agrochemicals, dyes and pigments, aromas and flavors, specialty chemicals.

4.3 Case studies

5 Polymerization and polymer materials

5.1 Chemistry and characterization of polymers: Definitions and nomenclature of macromolecules;

Classification of polymers; characterization methods

5.2 Types of Polymerization: Mechanisms and kinetics of polymerization reactions

5.3 Processing of polymers

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

The curricular unit of Transformation of petrochemical products aims to provide students with knowledge about the processes of obtaining petrochemicals, formulation of final products of the refinery and petrochemical transformations downstream of the refinery products. Thus the student should be able to identify the main products of the refinery and their formulations as well as the most important transformations of some of these products or byproducts. This course aims to give a comprehensive view of the petrochemical industry, which is achieved by following the syllabus contents.

References:

1. J. Brandrup, E.H. Immergut, E.A. Grulke, Polymer Handbook, John Wiley & Sons, 4ª Ed., 2003

2. Mohamed A. Fahim,Taher A. Al-Sahhaf, Amal Elkila; Fundamentals of Petroleum Refining, Elsevier 2010

3. Peter Pollak, "Fine Chemicals The Industry and Business", Willey Interscience, 2007