NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF PETROLEUM AND PETROCHEMICAL ENGINEERING
PETROCHEMICAL ENGINEERING PROGRAM

HC412 – BASIC PETROCHEMISTRY

I. GENERAL INFORMATION

CODE	**:**	HC423 – Basic Petrochemistry
SEMESTER	**:**	8
CREDITS	**:**	4
HOURS PER WEEK	**:**	5 (3 Theory – 2 Practice)
PREREQUISITES	**:**	Physical-Chemical Properties of the Hydrocarboons HC412
CONDITION	**:**	Compulsory

II. COURSE DESCRIPTION

The course prepares the student in the application of concepts, methods, process techniques, basic petrochemical industry technologies to describe basic olefin and aromatic production processes, analyzing operational variables and typical operating conditions; Making analysis of existing technologies, plant costs, processing costs and sales value of the products.

III. COURSE OUTCOMES

At the end of the course, students:

1. Solve Design Problems of Olefins and Aromatics Production Processes using Engineering Concepts.
2. Integrate the concepts of physicochemical, organic, Materials, Corrosion related to obtaining production of the process.
3. Recognize the importance of the economic costs of the process, deducing the best process for generating benefits in production.
4. Evaluate to scale the production amount expressed in engineering.
5. Determine the components that generate pollutants from which tends to decrease these pollutant components.
6. Express continuous communication in the development of the classes.

IV. LEARNING UNITS

1. THE PETROCHEMICAL INDUSTRY / 8 HOURS

General scheme; Its relationship with the chemical, oil refining and natural gas and fertilizer industries.

2. DEVELOPMENT OF THE TRANSFORMATION AND BASIC DIRECTIONS OF PETROLEUM USAGE / 8 HOURS

Raw material / Transformation of petroleum hydrocarbons.

3. OBTAINING OLEFINS / 12 HOURS

Generalities / Thermal Cracking / Pyrolysis: Craking Section; Section of fractionation and preliminary treatment; Purification and separation of ethylene; Extraction and purification of butadiene; Food and performance. Process characteristics: Thermodynamics; Kinetics; Balance of matter and energy; Process variables (pressure, temperature, residence time, vapor / hydrocarbon ratio, KSF). / Current process schemes: Gaseous loads; Liquid loads / Pyrolysis reactor modeling / Other pyrolysis processes: Hydropyrolysis, pyrolysis of crude oil and pyrolysis in the presence of catalysts. / Economic evaluation of the pyrolysis process.

4. OBTAINING AROMATICS / 4 HOURS

Generalities: Formation of aromatics; Reformed Elemental Reactions (Types of Reactions, Mechanism and Characteristics of Elementary Reactions); Reforming catalyst (types, poisons, catalyst life); Extraction and separation of aromatics; Maximization of benzene and / or p-xylene / aromatic complex: General description; Individual process units: Pre-treatment of the load to the reforming; Catalytic reforming; Hydrogenation of pyrolysis gasoline; Aromatic extraction; Division; Hydrodealkylation; Disproportionation; Crystallization of p-xylene; Isomerization / Economic evaluation of the aromatic production scheme.

V. LABORATORY AND PRACTICAL EXPERIENCES

There are 05 directed practices and 05 qualified practices.

VI. METHODOLOGY

The course is developed in sessions of theory, practice and laboratory sessions. In theory sessions, the teacher presents concepts, standardized laboratory tests and applications. In practical sessions, various problems are solved and their

Solution. In laboratory sessions, specialized laboratory equipment is used to analyze the physicochemical characteristics of hydrocarbons. In all the sessions the active participation of the student is promoted.

VII. GRADING FORMULA

The “G” evaluation system is used. Calculation the Final Average:

FA = (ME + FE + AP) / 3

MP: Mid-term Exam. FE: Final Exam.
AL: Average of Qualified Practices.

VIII. BIBLIOGRAPHY

1. **WUITHIER, PIERRE** Oil, Refining and Chemical Treatment. Editorial Prentice Hall, 1971
2. **Albright, L.F.; Crynes B.L.; Corcoran W.H** Luis Pyrolysis: Theory and Industrial Practice. Editorial Academic Press, 1983.