



ChE 444 - Petroleum Refining

Code and Name: ChE 444 - Petroleum Refining

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Petroleum Refining Technology, Prasad, R, 3rd edition, Khanna, 2002

Other References:

- Petroleum Refinery Engineering, Nelson, W.L., McGraw-Hill Book Co.

- Plant Design and Economics for Chemical Engineers, M. S. Peters and K. D. Timmerhaus, 3rd ed., McGraw-Hill, 1991

- Chemical Engineering Vol 6, J. F. Richardson J. H. Harker, and J. R. Backhurst, Butterworth-Heinemann, 2002

- Plant design and cost estimation, American institute of chemical engineers, 1985. W.D. Seider et al, Process Design Principles, 1st. edition, 1999.

Course Description:

The origin and composition of petroleum. Crude oil analysis and evaluation. Petroleum products and their uses. Refinery structure. The main units operation in the different refinery processes: Atmospheric & vacuum distillation, fluid catalytic cracking, platforming, hydro-desulfurization and hydrotreating processes. Chemical treatment. Asphalt production. Lube oils production. Refinery Utilities. Standards and specifications of fuels.

Pre-requisites: CHE 325 Unit Operations, CHE 326 Mass Transfer

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Recognize crude oil properties, products and characterization (1)
2. Research about recent topics in petroleum refining (4)
3. Design of equipment in petroleum refining plant (2)
4. Calculate the blend properties such as vapor pressure, octane number, and API gravity (1)
5. Explain different conversion or treating processes used for products upgrading and treating purposes (2)
6. Diagram the distillation, treating and conversion processes flow sheets (6)

Topics to be covered:

- Introduction and origin of petroleum
- Composition of crude oil and petroleum products
- Crude oil properties
- Dewatering and desalting of crude oil
- Manufacturing processes and petroleum products
- Application of absorption and solvent extraction
- Catalytic cracking
- Reforming Processes and refinery utilities
- Alkylation and polymerization
- Treating processes
- Designing of refinery equipment

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

