

Refining processes

- 1. Course number and name:** 020PRPCS3 Refining processes
- 2. Credits and contact hours:** 6 ECTS credits, 3x1:15 contact hours
- 3. Names of instructors:** Malek Msheik
- 4. Instructional materials:**
 - Course PDF shared with students (slides format)
- 5. Specific course information**
 - a. Catalog description:**

Physico-chemical properties and standardized tests, Relations between product specifications and their use (fuels and other products), Implementation of crude oils, Petroleum logistics, Strategic stocks, Petroleum distribution. Industrial catalysts, Catalytic reforming, Isomerization, HDS, VGO and residues catalytic cracking, VGO and residues hydrocracking, Sulfur chain, FCC gasoline treatment, oligomerization, etherification, alkylation, Residue recovery, visbreaking, coking, Softening, The base oils, waxes, paraffins, bitumens. Gas: deacidification, dehydration, extraction of liquid in gases and application exercises, Liquefaction of natural gas, Transport by gas pipeline, LNG transport-terminals, Flow assurance, Synthesis gas: H₂ production and Fischer Tropsch process, SMDS, Steam cracking, the aromatic loop, selective hydrogenations, Ethylbenzene - Styrene, PEHP. Practical work: petroleum analysis.
 - b. Prerequisites:** 020CORNI3 Organic Chemistry
 - c. Required/Selected Elective/Open Elective:** Required
- 6. Specific goals for the course**
 - a. Specific outcomes of instruction:**
 - Learn about the different types of crude oil and their composition, including the various components present in crude oil.
 - Understand the importance of standardized tests in the refining process, such as tests for measuring the quality and properties of crude oil and petroleum products.
 - Explore the production and properties of different fuels, including gasoline, diesel, and jet fuel and learn about the refining processes involved in producing these fuels.
 - Examine the process of isomerization, which involves converting straight-chain hydrocarbons into branched-chain hydrocarbons and learn about the benefits and applications of isomerization in the refining industry.
 - Analyze the methods and processes involved in the production of dihydrogen (hydrogen gas) in the refining industry and understand the importance of dihydrogen as a feedstock and its various applications.

- Explore the process of catalytic cracking, which involves breaking down heavy hydrocarbon molecules into lighter ones and learn about the catalysts used and the conditions required for efficient cracking.
- Study the process of catalytic reforming, which involves converting low-octane naphtha into high-octane gasoline and understand the role of catalysts and the conditions necessary for successful reforming.

b. PIs addressed by the course:

PI	7.1	7.2
Covered	x	x
Assessed	x	x

7. Brief list of topics to be covered

- Classification and constitution of crude
- Standardized tests
- Fuels
- Isomerization
- Production of hydrogen
- Catalytic cracking
- Catalytic reforming