CML 424: PETROLEUM REFINERY ENGINEERING

Course No.: CML424
Course Title: Petroleum Refinery Engineering
Course Type: Elective
Course Credits: 3

Course description:
A brief review of the basic principles and existing techniques of petroleum refinery such as exploration of crude oil, characterization, and fractionation into usable petroleum products. Recent advancements in secondary processes on the above areas to meet the revised standard and specification of the petroleum products. This course will end up with the understanding of the fundamentals of refinery and present and future requirements of the refinery/oil sector.

Pre-requisites: CML 361, CML366

Textbooks:

Objectives:
1. To develop the fundamentals of refining of petroleum crude oil and its fractionation in different useful petroleum products.

2. The student will be aware of the product quality, related environmental concern, and the standards by applying the different primary, secondary and advanced refinery processes.

3. The student will be aware to problems and remedies in the petroleum sector.

4. To develop the skill and knowledge for upgradation of petroleum refineries as per present and future demand.

5. To develop the responsibility of technological inputs related to energy and environmental demand.

Outcomes:

At the end of the course, the student will understand the fundamentals and advances in the refinery sector. Students will gain detailed knowledge of exploration of crude oil, its fractionation into different useful petroleum products, their quality, related environmental concerns and the standard by the recent and updated technology. The students will be able to visualize the scenario of the refinery in India and abroad and can work in refineries and R&D sector of the related area.

Expanded Course description:

Unit I (6 hrs): Fundamental principles of origin and occurrence of petroleum crude and its exploration, Composition of petroleum, classification and physical properties, Characterization of crude oil and petroleum products, the status of petroleum refining in India, future refining trends.

Unit II (6 hrs): Crude oil Distillation Process, Pretreatment of crude, atmospheric and vacuum distillation process

Unit III (6 hrs): Secondary conversion processes: Thermal and catalytic cracking, Catalytic reforming, Pyrolysis

Unit IV (6 hrs): Heavy Residue Upgradation Technologies: Hydrocracking, Hydrotreating,
visbreaking and coking, alkylation, Isomerisation, dehydrogenation processes, polymerization.

Unit V (6 hrs): Lubricating oil, grease, and Bitumen: Dewaxing and deoiling, deasphalting, lube hydrofinishing, bitumen air blowing, Sweetening and Desulphurization, Hydrodesulphurisation of petroleum products.


Class Schedule: Three lectures of 60 minutes each per week.