CHPE02 PETROLEUM REFINERY ENGINEERING

COURSE OBJECTIVES:

1. To understand the properties and their significance of crude oils and Petroleum fractions.
2. To understand, design and analyze the various petroleum refinery processes including primary, secondary and supporting processes.
3. To understand the process technologies for the petrochemical products.
4. To understand suitable thermal/catalytic conversion (cracking) processes for Vacuum gas oil/residue upgradation and to produce desired fuel blend components and petrochemical feed stocks.

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Understand the overall scenario of quality of crude oil.
2. Calculate different Petroleum Products and their specifications.
3. Know the different processes involving for up gradation of petroleum fractions.
4. DemonstrateThermal & Catalytic cracking processes.

UNIT I [CO:1] **(12)**

Origin, formation and composition of petroleum: Origin and formation of petroleum, Reserves and deposits of world, Petro Glimpses and petroleum industry in India, Dehydration and desalting of crudes.

Refinery feed stocks: Crude oil classification-Composition and properties-Composition of petroleum crude suitable for asphalt/coke manufacture â€“ Evaluation of crude oils.

UNIT II [CO:2] **(12)**

Petroleum Products and their specifications: LPG- Gasoline- Diesel fuels- Jet and turbine Fuels â€“ Blending of gasoline.

Lube oils-Heating oilâ€™s â€“ Residual fuel oils - wax and asphalt- Petroleum coke- All Product specifications-Product blending.

UNIT III [CO:3] **(12)**

Crude distillation: Atmospheric and Vacuum distillation units, Auxiliary equipment such as pipe still heaters and heat exchanger trains etc.

Catalytic reforming and isomerization: Catalytic reforming processes (for petroleum and petrochemical feed stocks) â€“ Isomerization Processes -Feed stocks-Feed preparation â€“ Yields.

Thermal & Catalytic cracking processes: Visbreaking- Delayed Coking â€“Fluid Catalytic cracking and Hydrocracking - Feed stocks â€“â€“ Catalysts - Process variables â€“Product Recoveries-Yield estimation.

UNIT IV [CO:4] **(12)**

Hydrotreating & Hydroprocessing: Naphtha, Kerosene, Diesel, VGO & Resid. Hydrotreating / Hydroprocessing â€“ Feed stocks â€“ Process description and Process variables.

Quality, Storage and transportation: Octane number, Cetane number, Diesel index, their determination and importance Storage of petroleum products: tanks, bullets, special types of spheres etc.

Transportation of petroleum products: road, rail, sea and pipeline; Importance of pipeline transportation.

LEARNING RESOURCES:

TEXT BOOK:

Petroleum Refining: Technology and Economics, J.H. Gary and G.E.Handwerk, 4th Edition, Marcel Dekkar, Inc., 2001.

REFERENCE BOOK(s):

1. Petrochemical Process Technology, ID Mall, Macmillan India Ltd., 2007.
2. Handbook of Petrochemicals Production Processes, R.A. Meyers, TRW, Inc., 2005.
3. Petrochemicals, P.Wiseman, Ellis Horwood, 1986
4. Modern Petroleum Refining Processes, B.K. BhaskaraRao, 5th Edition, Oxford & IBH Publishing, 2011.