

4thSemester	RPP4C003	Petrochemical Engineering	L-T-P 3-0-0	3 CREDITS
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Module I: (08 hrs)**Origin and Composition of Petroleum**

Occurrence, Theories of formation, reserves deposits in world & Gas scenario in India, Refineries in India, Estimation of energy reserves. Composition of petroleum & Their structures, sulphur, nitrogen, oxygen & metal organic compounds in petroleum.

Module II: (07 hrs)**Evaluation of Petroleum**

Classification of petroleum- Paraffinic base, Mixed base & Naphthalenic base, UOP characterization factor, Correlation index, Distillation characteristics, true Boiling Point apparatus, Avg. Boiling point Thermal properties of petroleum fractions- Heat of combustion, Latent heat of Vaporization, Latent heat of fusion, Thermal expansion, Spontaneous ignition temperature, V.I

Module III: (10 hrs)**Important petroleum Fractions**

1. Gases-its types & testing, 2. Gasoline- its types & testing (ASTM) distillation, RVP Octane no, Sulphur content), 3. Gasoline additives – detergents, Corrosion & Oxidation inhibitors, Combustion aids, Anti knocking, Dyes, 4. Aviation turbine fuels, jet fuels specification, Naphthas, 5. Kerosene- (Testing-Flash pt & Smoke point, Volatility, Sulphur content, Aniline point), 6 Diesel fuels- Classification, Specification, Pour pt, Aniline pt, Flash pt CV, Viscosity, Diesel additives, 7. Lube Oils- Composition, Classification- machine & oils, Turbine oils, Transformers oils etc.

Module IV: (10 hrs)**Petrochemicals**

Introduction, Development of Petrochemical industry in India, Sources of Petrochemicals and Classification of petrochemicals- I Generation; Study of preparations & derivatives obtained from methane ethane, propane, ethylene Propylene, butylenes, acetylenes, butadiene aromatics, BTX etc. II Generation; products & derivatives obtained from styrene, dimethyl terephthalate, acrylonitrile, ethylene glycol, vinyl chloride, adipic acid, isopropyl alcohol, ethanol (shell process) acetone etc. III Generation: Products obtained from Polystyrene, PVC, DDT azodyes, PE, PP, polyesters, Synthetic fibers, synthetic detergents, Pesticides from petroleum, petroleum protein, Explosives from petroleum.

Module V: (10 hrs)

Crude distillation & Treatment of petroleum Fractions

Impurities in Crued oil, desalting of crude oils, Atmospheric distillation of crude, Vacuum distillatrion of crude oil. Physical – mechanical- chemical impurities, Sweetening of petroleum by- Physical extraction, oxidizing merceptans to disuophides, destruction of sulphur bearing compounds Catalytic conversions in presence of Hydrogen, Treatment of LPG, Gasoline treatment- copper chloride process, Inhibitor sweetening, Caustic & methanol treatment Lead doctoring, Merox sweetening, Sulphuric acid treatment, desulphurization, kerosene treatment – Liquid SO₂ Extraction of aaromatics Lube treatment – Sulphuric acid treatment, Clay treatment Solvent treatment.

Books:

1. J.H. Gary, and G.E. Handwerk, Petroleum Retroleum Refining: Technology and Economics. 3rd edition, Marcel Dekker Inc. 1994
2. J.H Speight, The chemistry and technology of Petroleum Jydrocarbon, 3rd edition.
3. G.N. Sarkar, Advance Petroleum Refining, Khanna Publishers, 1998.