

UG  
Course Code: CH207  
Credit: 3  
Version: 1  
Prerequisite Course: Nil

Department: **Chemical Engineering**  
Course Name: **Energy Resources Utilization**  
L-T-P: **3-0-0**  
Approved on:

**Introduction:** Synthetic fuels and their manufacture, Introduction and Classification of Fuels, Fundamentals, Units and their conversions, Properties of coal, oil shale, and Tar Sands.

**Solid Fuels:** Wood, Wood charcoal and Peat. Origin, Composition, Characteristics, and Significance of constituents of coal, Petrography of coal, Washing of coal, Storage of coal. Pulverised fuel/coal, Uses of coal, Comparison of Solid, Liquid, and Gaseous fuels. Selection of coal, Mineral matters in coal ash, and clinker formation; Properties and Testing of coal, Classification of coal, Carbonisation of Coal-coke making and Byproducts recovery, Characteristics and distribution of Indian coals, Briquetting of Solid fuels/Coal.

**Liquid Fuels/Petroleum Refining:** Origin, Composition, Classification, and Constituents of Petroleum: Indian crudes. Processing of Crude oil: Distillation, Cracking – Thermal and Catalytic, Reforming - Thermal and Catalytic, Polymerisation, Alkylation, and Isomerisation. Purification of Petroleum products, Antiknock value and Requisites of good quality gasoline, Diesel and fuel oil, Liquid fuels from Coal by hydrogenation/ liquefaction, Other liquid fuels – Benzol, Shale oil, alcohol, and Colloidal fuels. Storage and Handling of Liquid Fuels/Fuel oils

**Gaseous Fuels:** Methane, Wood gas, Gobar gas, Sewage gas, Gas from underground gasification of coal, Natural gas, LPG, Refinery gases, Producer gas, and Water gas.

**Furnaces:** Introduction, Waste heat recovery in furnaces, Classification of furnaces.

**Nuclear Fuels and their Utilization:** Introduction, nuclear fuel resources in India, Nuclear reactors- introduction. Classification of nuclear reactors, Types of nuclear reactors.

### **Books**

1. Gupta, O.P., “*Fuels, Furnaces & Refractories*”, Khanna Publishers, Delhi, 2000.
2. Probst, R. F. and Hicks, R. E., “*Synthetic Fuels*,” McGraw Hill, NY, 1985.
3. Sarkar, S., “*Fuels and Combustion*,” 2<sup>nd</sup> ed., Orient Longman, Bombay, 1990.