

PCE4I104 FUEL AND ENERGY TECHNOLOGY

Module I:

Fuels: Solid Fuels: Coal - Origin, chemical composition, calorific value, classifications, Characteristics & distribution of Indian coals, storage and spontaneous combustion of coal, coal washing and blending, petrographic constituents of coal, carbonization of coal, manufacture and properties of metallurgical coke, recovery of by-products.

Module II:

Liquid Fuels: Origin and composition of crude oil, crude oil distillation and its products with special reference to gasoline, kerosene and diesel oil, cracking and reforming, coal tar distillation products, Shale oil.

Gaseous Fuels: Natural gas, coal gas, coke oven and blast furnace gas, manufacture of water gas and producer gas, carbureted water gas.

Module III:

Synthetic Fuels: Hydrogenation of coal, Fischer-Tropsch synthesis.

Nuclear Fuels: Introduction, nuclear fuels and nuclear reactors, moderators and structural materials. Introduction to renewable energy sources.

Module IV:

Combustion: Combustion of solids fuels, calculation of volumes and weights of air necessary for combustion of fuels, gas analysis.

Text Books:

1. *Fuels and Combustion, 3rd ed. by S Sarkar, Universities Press.*
2. *Elements of Fuels, Furnaces & Refractories by O P Gupta, Khanna.*

Reference Books:

1. *The Elements of Fuel Technology, 2nd ed. by G W Himus, L Hill.*
2. *Fuel Solid, Liquid and Gaseous, 4th ed. by J S S Brame and J G King, Edward Arnold.*

FUEL TECHNOLOGY LAB

1. *Determination of moisture content, volatile matter, carbon, and ash by Proximate Analysis method.*
2. *Determination of Cloud & Pour Point of an oil sample.*
3. *Determination of Flash & Fire Point of an oil sample.*
4. *Determination of Moisture Content of an oil sample by Dean & Stark Apparatus.*
5. *Determination of Carbon Residue of an oil sample by Conradson's Apparatus.*
6. *Determination of Aniline Point of an oil sample.*
7. *Determination of Viscosity of an oil sample by open cup apparatus.*
8. *Determination of Viscosity of an oil sample by closed cup apparatus.*
9. *Determination of Calorific Value of a fuel sample by Bomb Calorimeter.*
10. *Determination of washability characteristics of the supplied sample of Coal using Float and Sink test.*