

MLPC3005 COAL PETROGRAPHY AND PREPARATIONS (3-0-0)

Course Objective:

- The course aims to provide fundamental knowledge of coal origin, properties, and classification, along with practical skills in coal analysis and beneficiation.
- It enables students to understand processing methods, evaluate washability, apply modern cleaning technologies, improve coal quality, and analyze national and global coal washing practices.

Module I (06 Hours)

Basics of coal and its characteristics: coal origin and formation, organic and inorganic constituents of coal, size analysis, constitutional analysis, coal rank, physical and chemical properties of coal, geological classification and industrial usage-based classification. Testing and utilization of coking and non-coking coal.

Module-II (06 Hours)

Fundamentals of coal processing: Coal processing objective and scope, screening, crushing, grinding of coal, principles of density difference, coal washability curves, sink-float tests. Gravity based separation methods- Heavy media separation, jigging, flowing film concentration, cyclone separation.

Module-III (06 Hours)

Fine coal processing Technology: challenges in fine coal cleaning, coal flotation, water only cyclone, enhanced gravity separators (Knelson, Falcon), Vorsyl separator, dense medium cyclones, dewatering of coal. Dry beneficiation of coal, applications and efficiency improvement.

Module IV (06 Hours)

Coal washing efficiency and global practices: coal washing efficiency, partition curve, misplacement, Meyers curve, imperfection, yield reduction factor, organic efficiency etc. Coal washing flowsheet and practices in India, global coal washing practices, economics of coal preparation.

Module V (06 Hours)

Modern trends, challenges and future improvements: modern beneficiation methods like sensor-based sorting, froth flotation advances, oil agglomeration, Automation, AI and data analytics in washery control, challenges in Indian coal industry, improvements needed in coal beneficiation, future of coal beneficiation.

Course Outcome:

- CO1: To understand the basics of coal formation and its characteristics
- CO2: To acquire the fundamentals of coal preparation
- CO3: To explore the technologies of fine coal cleaning
- CO4: To acquire knowledge of coal washing efficiency and washing practices
- CO5: To explore modern beneficiation methods, industry challenges and need for improvement

Text Books:

1. Subba Rao D. V. & Gouricharan T., Coal Processing and Utilization, CRC Press
2. Osborne D., The coal handbook: Towards cleaner production, Volume-1 and Volume-2, Woodhead Publishing Limited

Reference Books

1. Singh M.P., Coal and Organic Petrology, Hindustan Publishing Corporation
2. Speight J. G., The Chemistry and Technology of Coal, CRC Press
3. Riazi M. R. & Gupta R., Coal Production and Processing Technology, CRC Press