

Add-on Certificate Course: Basics of Coal Petrography

Instruments/Materials Required by the department to begin the course:

- Classroom with smart board.
- Leica **DM750 P** Microscope: This model has to be configured with TL+RL + camera Flexacam C3 + 4x, 10x, 20x and with 50x XLR oil immersion lens for Coal microscopy.

Department of Geology
St. Xavier's College, Ranchi

Add-on Certificate Course: Basics of Coal Petrography

Context:

Coal petrography is a specialized field within fuel geology and applied earth sciences that focuses on the microscopic characterization and classification of coal. It plays a crucial role in understanding the nature, quality, and industrial applicability of coal resources. With increasing demand in energy exploration, environmental monitoring, and various industrial processes, coal petrography provides essential insights into coal's composition and rank, directly influencing its use in sectors such as metallurgy, power generation, and clean energy technologies like coal-bed methane, gasification, and liquefaction.

The discipline involves identifying coal constituents—known as macerals—and evaluating coal rank through techniques like reflectance microscopy. Historical foundations of the field were laid in the early 20th century by pioneers like White, Theissen, Stach, and Stopes, who developed fundamental techniques and classifications still in use today. The establishment of the International Committee for Coal Petrology (ICCP) in 1950 further standardized methodologies, contributing to global consistency in petrographic analysis.

Petrographic analyses are critical for selecting suitable coals for coke making, assessing coalbed methane potential, verifying imported coal quality, and characterizing exploration block samples. The results support both industrial application and geological reporting.

With increasing importance in energy resource exploration, environmental assessment, and industrial applications, a foundational understanding of coal petrography is highly beneficial for students and early-career professionals. This add-on course aims to provide practical and theoretical knowledge in the subject, enabling learners to enhance their skill set and prepare for opportunities in research and industry.

Objective:

- To introduce the basic concepts of coal formation, composition, and classification.
 - To understand the petrographic constituents of coal including macerals and microlithotypes.
 - To equip learners with techniques of sample preparation and microscopic examination.
 - To demonstrate the applications of coal petrography in exploration, quality assessment, and carbon management.
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Target Group:

- UG/PG students of Geology, Applied Geology, Earth Sciences, and Environmental Science.
 - Research scholars working in the domain of fuel geology.
 - Limited to **30 participants** on a first-come, first-served basis.
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Course Duration:

- **30 hours** (including lectures, demonstrations, hands-on sessions, projects and assessments)
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Course Content:

1. **Introduction to Coal and Organic Matter**
2. **Formation and Types of Coal**
3. **Coal Macerals: Vitrinite, Liptinite, Inertinite**
4. **Microlithotypes and their Identification**
5. **Coal Rank and Coalification Process**
6. **Sample Collection, Preparation, and Polishing Techniques**

7. Use of Microscope in Coal Petrography

8. Coal Petrology in Industry and Research Applications

Certification:

- A certificate of completion will be issued to participants who attend at least 80% of the sessions and complete the final assessment.
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Course Fee:

- **Rs. 2000/-** per participant (Non-refundable)
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Pedagogy and Methodology:

- Lectures with visual presentations
 - Demonstrations using microscopes and polished blocks
 - Evaluation through quizzes and report submission
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How to Apply:

- Interested candidates must fill out the **online registration form** (link to be provided).
 - Pay the course fee via UPI/Bank transfer (details to be shared in the registration form).
 - Confirmation email with schedule and instructions will be sent upon successful registration.
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Contact Details:

Department of Geology, St. Xavier's College, Ranchi