Course Type	Course Code	Name of Course	L	T	P	Credit
DP (Hons)	NGLH402	Fundamentals of Coal Geology Practical	0	0	3	1.5

Course Objective

To develop advanced practical competence in coal characterization through hand specimen analysis, lithotype identification, extended petrographic studies across coal ranks, seam architecture interpretation and applied geochemical numericals, integrating laboratory microscopy with modern analytical tools

Learning Outcomes

Upon completion of the course, students will be able to:

- Identify and classify coal types through megascopic and lithotype analysis.
- Distinguish maceral assemblages across different coal ranks from sub-bituminous to anthracite and thermally altered coals
- Interpret seam formation curves and cyclicity patterns
- Prepare and examine polished coal blocks under reflected light microscopy
- Understand SEM sample preparation and microstructural analysis of coal
- Perform quantitative interpretation of organo-geochemical data, degree of kerogen conversion and coal blending calculations for thermal and steel industries

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	**Hand Specimen and Rank Identification:** Megascopic examination of coal samples; identification of sub-bituminous, high volatile, medium volatile, low volatile bituminous, anthracite and Jhama; physical properties and rank indicators	2	Ability to differentiate coal ranks and varieties based on megascopic characteristics
2.	**Lithotype Identification and Seam Logging:** Recognition of vitrain, clarain, durain and fusain; lithotype logging; preparation of seam formation curves; interpretation of vertical variation and cyclicity; identification of cleats	2	Ability to interpret seam architecture and depositional cyclicity from lithotype variations
3.	**Coal Petrography (Reflected Light):** Preparation of polished blocks; identification of vitrinite, inertinite and liptinite macerals; comparison across coal ranks (sub-bituminous to anthracite); identification of thermally altered coal (Jhama); mineral matter recognition	3	Ability to identify maceral assemblages across ranks and interpret petrographic evolution of coal
4.	**Integrated Coal Facies Interpretation Exercise:** Combined interpretation of coal facies using maceral composition, lithotype distribution, depositional mechanisms and mire hydrology	1	Ability to synthesize petrographic, lithological and depositional data to reconstruct coal-forming environments and interpret the evolutionary history of a coal seam
5.	**SEM Exposure and Sample Preparation:** Principles of SEM; sample coating and preparation; microstructural observation of coal; pore structure and mineral associations	1	Understanding of advanced microstructural analysis techniques in coal studies

6.	**Source Rock and Rock-Eval Interpretation Numerical:** Interpretation of S1, S2, TOC; calculation of Hydrogen Index; estimation of degree of kerogen conversion; maturity interpretation without reflectance data	2	Ability to quantitatively interpret organic geochemical data for coal and source rock evaluation
7.	**Coal Technological, Blending and Industrial Numerical:** Coal blending calculations; ash and volatile matter balancing; calorific value estimation; performance prediction using proximate analysis data	2	Ability to perform applied coal blending and quality prediction calculations
8.	**Practical Examination**	1	
	Total classes	14	

Textbooks:

1. Taylor, G.H., Teichmuller, M., Davis, A, Diesel, C.F.K., Littke, R.,P., 1998. Organic Petrology GerbrüderBorntraeger, Berlin. 16,704.
2. Applied Coal Petrology- The Role of Coal Petrology in Coal Utilization by Isabel Suarez-Ruiz and John C. Crelling (Eds), Academic Press (2008)
3. North F. K., Petroleum Geology. Allen & Unwin Inc., London

Reference Books:

1. Coal bearing depositional system by CFK Diessel, 1992 Edition
2. The Chemistry and technology of coal- James G. Speight, 1994
3. Tissot, B.P. and Welte, D.H., 2013. *Petroleum formation and occurrence*. Springer Science & Business Media.