

## DISCIPLINE SPECIFIC CORE COURSE – DSC – 17: Fuel Geology ((L3, P1)

### Credit distribution, Eligibility and Prerequisites of the Course

| Course title & Code             | Credits | Credit distribution of the course |          |                     | Eligibility criteria               | Pre-requisite of the course (if any)                                         |
|---------------------------------|---------|-----------------------------------|----------|---------------------|------------------------------------|------------------------------------------------------------------------------|
|                                 |         | Lecture                           | Tutorial | Practical/ Practice |                                    |                                                                              |
| DSC – 17: Fuel Geology (L3, P1) | 4       | 3                                 | 0        | 1                   | 12 <sup>th</sup> pass with science | Studied Stratigraphy, Earth System Science, Structural Geology or Equivalent |

### Learning Objectives

The course on fuel geology is intended to provide basic scientific knowledge and understanding about the natural fossil fuels i.e., petroleum and coal to students of geology. Because use of petroleum resources and its exploration is the most powerful driving forces shaping our modern world.

### Learning outcomes

After completion of this course students will be able to understand and comprehend the processes involved in generation of hydrocarbons and the formation of coal and the exploration methods. Students will also have a comprehension about the conventional and non-conventional fuels and their demand through time.

### SYLLABUS OF DSC- 17

#### Theory (45 hours)

#### UNIT – I (9 hours)

##### Detailed contents

Coal: Definition and origin of Coal; Classification of coal; Fundamentals of Coal Petrology - Introduction to lithotypes, microlithotypes and macerals in coal, Proximate and Ultimate analysis.

#### UNIT – II (9 hours)

##### Detailed contents

Coal as a fuel: Coal Bed Methane (CBM): global and Indian scenario; Underground coal Gasification; Coal liquefaction

#### UNIT – III (9 hours)

##### Detailed contents

Petroleum: Chemical composition and physical properties of crudes in nature; Origin of petroleum; Maturation of kerogen; Biogenic and Thermal effect. Van Krevelen diagram

#### UNIT – IV (9 hours)

##### Detailed contents

Oil migration: Primary and secondary. Role of capillary pressure and Buoyancy. Petroleum Reservoirs and Traps: Reservoir rocks: general attributes and petrophysical properties.

## **UNIT – V (9 hours)**

### **Detailed contents**

Classification of reservoir rocks - clastic and chemical. Hydrocarbon traps: definition, Structural, Stratigraphic and Mixed. Time of trap formation and time of Hydrocarbon accumulation. Cap rocks - definition and general properties. Plate tectonics and global distribution of hydrocarbon reservoir.

### **Practical Component- (30 Hours)**

Study of hand specimens of coal. Reserve estimation of coal. Section correlation and identification of hydrocarbon prospect. Panel and Fence diagrams

### **Essential/recommended readings**

Shelly R. C. (2014). Elements of Petroleum geology: Third Edition, Academic Press.  
Bjorlykke, K. (1989). Sedimentology and petroleum geology. Springer-Verlag.

### **Suggestive readings (if any)**

Shelly R. C. (2014). Elements of Petroleum geology: Third Edition, Academic Press.  
Bjorlykke, K. (1989). Sedimentology and petroleum geology. Springer-Verlag.  
Chandra D. (2007). Chandra's Textbook on applied coal petrology. Jinasa Publishing House  
North, F.K., 1985 Petroleum Geology  
Bastia, R., & Radhakrishna, M. (2012). Basin evolution and petroleum prospectivity of the continental margins of India (Vol. 59). Newnes.