Economic Geology

1.1. Course Number: GE414

1.2. Contact Hours: 3-0-0 Credits: 9

1.3. Semester Offered: 4th Year-Even

1.4. Prerequisite: Petroleum Basic knowledge of Geology and Chemistry

1.5. Syllabus Committee Members: Dr. Alok Kumar Singh & Dr. Hemant Kumar Singh

2. Objective: To import knowledge about the ore genesis, ore formation, and localization of ore deposits and the minerals associated with ore deposits.

3. Course Content: Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topics	Lectures
1	Introduction and Basic Concept of Minerals and Ores	Concept of ore genesis; Spatial and temporal distribution of ore deposits; Ores, gangue minerals, tenor, grade, and lodes Resources and reserves- Economic and Academic definitions, Metallogenic epochs, and Metallogenic Provinces. Nature and morphology of principles types of ore deposits; Classification of ore deposits. Textures, paragenesis and zoning of ores and their significance.	8
2	Ore Formation and its Deposition	Concept of ore bearing fluids, their origin and migration. Wall rock alteration; Structural, physicochemical, and stratigraphic controls of ore localization; Ore deposits in relation to Plate tectonics; Fluid inclusions in ore – principles and applications.	8
3	Economic Mineral Deposits of India	Metallic Mineral Deposits of India with reference to thin mode of excursuses, Diagnostic physical properties, chemical composition, uses, modes of occurrence & distribution in India of following: 1) Economic Minerals: Gold, Silver, Copper, Lead, Zinc, Iron, Manganese, Chromium, Tin, Aluminium; 2) Industrial Minerals: Asbestos, Barite, Graphite, Gypsum and Mica; 3) Abrasives: Diamond, Corundum, Emery garnet, Abrasive sand, Tripoli, Pumice, Sand feldspar, Limestone, Clay, Talc; 4) Refractories: fireclay, graphite, Dolomite & sillimanite group of minerals, diaspore, pyrophillite, zircon; 5), Ceramic minerals: Clay, Feldspar, Wollastonite; 6) Radioactive Minerals: Thorium, Uranium, Titanium.	12
4	Fossils Fuels	Fossil fuels: coal and lignite, uses, classification, constitution, origin and distribution in India. Petroleum-	6

		composition, uses, theories of origin, oil traps, & important oil fields of India	
5	Mineral Exploration and its Significance in National Economy	Exploration and exploitation techniques, Remote Sensing, Geophysical and Geochemical Explorations Geological mapping at different scales, drilling, borehole logs and transverse sections, Significance of minerals in National Economy. Strategic, critical & essential minerals, Mineral policy of India.	6
		Total	**40**

4. Readings:

4.1. Textbook:

- Craig, J. R. and Vaughan, D. J. (1994): Ore microscopy and ore petrography, John Wiley & Sons.
- Umeshwer Prasad- Economic geology
- Evans, A. M. (1992): Ore geology and industrial minerals, Blackwell Science.
- Jensen, M. L. & Bateman, A. M. (1981): Economic mineral deposits, John Wiley & Sons.
- Misra, K. C. (1999): Understanding Mineral Deposits, Kluwer Academic Publishers.

4.2. Reference Books:

- Mookherjee, A. (1998): Ore genesis - a holistic approach. Allied Publishers.
- Stanton, R. L. (1981): Ore Petrology, McGraw Hill.1. Gokhale and Rao Ore deposits of India.
- Jensen and Bateman A.M. – Economic Mineral Deposits, Year
- Krishnaswamy, S. Indian Mineral Resources
- Park and Macdiarmid -Ore Deposits

5. Outcome of the course:

The manifestation of the course, if completed successfully can be reflected in the form of an insight as:

- Understanding of ore forming processes and characteristics of various types of ore deposits.
- Familiar with metallic, and nonmetallic ore deposits of India.
- To understand what kinds of minerals are formed on earth.
- It also enables the students to link events and to correlate them at field scales.