



MINERAL RESOURCES: GEOLOGY EXPLORATION ECONOMICS AND ENVIRONMENT

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TYPE OF COURSE : Rerun | Core | UG

COURSE DURATION : 12 Weeks (24 Jan' 22 - 15 Apr' 22)

EXAM DATE : 23 Apr 2022

PRE-REQUISITES : Introductory Geology (Physical Geology) Course

INTENDED AUDIENCE : Students from Universities at the level of B. Sc. in Geology as Major

INDUSTRIES APPLICABLE TO : Mining and Exploration Companies

COURSE OUTLINE :

This course may be looked as a first level course on Mineral Resources of the Earth that has the following broad components:

Conceptualization of ore formation as intimately linked to fundamental earth processes operating at different scales; parallelism between evolution of the crust and different deposit types through geologic ages; fundamental processes (magmatism, sedimentation, weathering/erosion, fluid activities) and morphology of resultant deposits.

ABOUT INSTRUCTOR :

Prof. M. K. Panigrahi is a faculty in the Department of Geology & Geophysics at IIT Kharagpur. He is well known in the Indian earth science circle as an expert in Economic Geology and has contributed significantly to mineralization of copper, tin and gold in India. He has been teaching various courses in Economic Geology for the last 22 years. He has published many peer-reviewed journal papers and conference papers, guided 13 doctoral students, and 36 masters students.

COURSE PLAN :

Week 1: Introduction; Space - time distribution of mineral deposits; Spatial distribution of mineral deposits in the context of present day global tectonics.

Week 2: Magmatic processes, Characteristics and Morphology of Deposits resulting from magmatism

Week 3: Sedimentary processes – characteristics and morphology of resultant deposits

Week 4: Hydrothermal processes - characteristics of hydrothermal ore fluids, sources, solubility of metals and mechanism of transport and deposition from fluids, characteristics of hydrothermal deposits

Week 5: Hydrothermal processes associated with felsic magmatism, sedimentary basins, metamorphism, volcanism on the sea floor and volcanic islands – resultant deposits and their morphology

Week 6: Introduction to Mineral Exploration – the four stage architecture (reconnaissance, detailed survey, target identification, exploratory drilling), Mineral deposits and mineral resource potentials of India

Week 7: Geological, geochemical and geophysical methods of mineral exploration, Application of remote sensing in mineral exploration

Week 8: Case studies of discoveries of important deposits across the world. (Gold, Diamond, porphyry copper, VMS, Uranium)

Week 9: Economic classification of Mineral Resources; Elements of Mineral Economics; demand-supply relationships and changing global scenario, international trade, policies and cartels,

Week 10: National Mineral Policy and Law of the Sea, Mineral resources in National Economy.

Week 11: Mineral deposit project evaluation; estimation of ore reserve (conventional and geostatistical methods),

Week 12: Environmental Impact of Mineral Resource Exploitation – exploration, mining, processing and post-processing scenarios.