MLPC2001 GEOLOGY (3-0-0)

Course Objective:
To enhance the fundamental knowledge in Geology and its applications in Mineral industry.

Module I (6 Hrs)
Mineral and ore characterization: Classification of Minerals, Physical, chemical and Optical characteristics of ore Types of structure- massive, pocket etc. Textures- disseminated, clustered, etc. Relationship between origin and structure and texture.

Module-II (6 Hrs)
Crystallography: Types of crystal structure, axial arrangement of minerals, symmetry elements present in normal class of cubic, tetragonal, hexagonal, orthorhombic, monoclinic and triclinic systems.

Module III (6 Hrs)
Petrology: Origin, occurrence, classification and Description of Igneous, Sedimentary and Metamorphic Petrology.
Ore genesis: classification of ore genesis, Magmatic Concentration, Hydrothermal Deposit, Residual and Mechanical Concentration, Contact Metasomatism, Oxidation and Supergene Enrichment, Sublimation, Evaporation, Metamorphism.

Module IV (6 Hrs)
Mineral Chemistry: Geochemical classification of Minerals, Geochemical Differentiation, Geochemical Cycle, Isomorphism, Polymorphism
Mineral Economics: Sampling, Assaying, Ore reserve Estimation

Module V (6 Hrs)
Stratigraphy: Standard Geological Time scale, stratigraphic Units, Preliminary idea of Indian Stratigraphy
Mineral Resources: Mineralogy, Indian Distribution, genesis, occurrence and uses of Iron, Manganese, Chromium, Aluminum, Copper, Lead, Zinc, Radioactive minerals.
Relevance and application in mineral processing with a few examples.

Course Outcome:
CO1: To understand the various properties of minerals for identification and classification
CO2: Demonstrate proficiency and perceptive of the basic concepts in crystallography.
CO3: To understand the concept of ore genesis
CO4: To acquire the knowledge of mineral chemistry and mineral economics for applications in mineral industry
CO5: To explore various mineral resources and stratigraphy

Text Books:

1. MukherjeeP.K., Text Book of Geology, World Press
2. MahapatraG.B., Text Book of Geology, CBS Publishers
3. SinghParbin, Geology for Engineers,IBH Publications, N. Delhi. 1991.

Reference Books:

1. Arthur Holemess, Principles of Physical Geology, Thomas Nelson and Sons,USA,1964.
2. Ford, W.E. Dana's Textbook of Minerology (4th edition), Wiley Eastern Ltd., N. Delhi,1989.
3. Winter, J.D. An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, N.Delhi, 2001.
4. Billings, M.P. Structural Geology, Prentice Hall Ino., N. Jersey, USA, 1972.
5. Krishnan M.S. Geology of India and Burma, 3rd Edition, IBH Publishers, N. Delhi,1984.
6. Gangopadhyay S.,Engineering Geology, Oxford University Press