

**Board of Studies in Geology**  
**FACULTY OF SCIENCE**  
**GONDWANA UNIVERSITY, GADCHIROLI**

**Syllabus of**

**B.Sc. Third Year (Semester Pattern)**

**SUBJECT - GEOLOGY**

**Semester V**

**B.Sc.**  
**Geology Semester V**  
**Paper I**  
**(Economic Geology)**

**Unit I**

Definition of ore, ore minerals and gangue minerals, grades of ores and non-metallic minerals, assay value and tenor of ore. Broad outline of ideas regarding classification of mineral deposits, Bateman's classification. Principles and processes of formation of mineral deposits in detail: Magmatic concentration deposits; Pegmatitic deposits; Sublimation deposits; Contact metasomatic deposits; Submarine exhalative volcanogenic deposits; Hydrothermal deposits (Cavity filling and replacement).

**Unit II**

Principles and processes of formation of following mineral deposits: Residual concentration deposits; Mechanical concentration deposits (Placers); Sedimentary deposits; Evaporites; Bacteriogenic deposits; Supergene sulphide enrichment deposits; Metamorphic and metamorphosed deposits with suitable Indian examples.

**Unit III**

Mineralogy, uses, geological occurrences, origin and geographical distribution of the mineral deposits of - Iron, Chromium, Tungsten, Tin, Lead, Zinc, Gold, Aluminium, Radioactive minerals, Natural hydrocarbons (oil and natural gas); Non-metals related to refractory, fertilizers, cement, chemical and gemstone industry like- Asbestos, Barytes, Gypsum, Mica, Graphite, Talc, Magnesite, Kyanite, Sillimanite, Monazite, Pyrite and Diamond.

**Unit IV**

Mineralogy, uses, geological occurrences, origin and geographical distribution in India of the following: Manganese, Copper, Fossil fuel: lignite and coal. Brief account of the geological setting and mineralization of the following: Kolar gold field, Singhbhum copper belt, Malanjkhand copper deposit, Lead zinc deposit of Zawar, Manganese belt of Maharashtra, Iron ore deposits of Bastar, Bauxite deposits of Maharashtra, Mica deposits of Bihar, and Andhra Pradesh. Gondwana coal deposits, Neyveli lignite deposit, Gypsum deposit of Rajasthan and beach placers of Kerala.

**Books recommended:**  
**Economic Geology**

1. Jensen and Bateman: Economic Mineral Deposits.
2. Sen and Guha: A Handbook of Economic Geology.
3. Banerjee D.K.: Mineral Resources of India.
4. Sharma and Ram: Introduction to India's Economic Minerals.
5. Deb: Industrial Minerals and Rocks of India.
6. Krishnaswamy: India's Mineral Resources.
7. Babu: Tin in India.
8. Babu: Diamonds in India.
9. Radhakrishnan and Curtis: Gold in India.
10. Deshpande: Geology of Maharashtra.
11. Prasad: Mineral deposits of India CBS Pub.

**Paper II**  
**(Elements of Remote Sensing and Geomorphology)**

**Unit I**

Definition of Remote Sensing. Scope and aim of Remote Sensing in Geology. Remote Sensing from aerial heights (Aerial photography), Remote Sensing from space heights (Satellite imagery), Aerial photography, Aerial camera, Types of aerial photographs, (black & white, colour and infra-red), Flights for obtaining aerial photos. Methods of studying aerial photos in the form of mosaics and stereopairs. Pocket and Mirror stereoscope.

**Unit II**

Recognition elements in the study of aerial photos- tone, texture, pattern, shape, size, form, shadow, drainage, vegetation, and landforms. Photographic expressions of various geological features on aerial photos and factors affecting such expressions (climate, vegetal cover, soil, type of weathering *vis-à-vis* nature and composition of rocks). Importance of concept of convergence of evidence in photo-interpretation. Guidelines for lithologic, structural and geomorphic interpretation.

**Unit III**

Scope and aim of geomorphology. Fundamental concepts, weathering, mass-wasting and related landforms. Fluvial cycle of erosion. Mackin's concept of graded streams. Drainage patterns and their significance.

**Unit IV**

Karst topography, Aeolian and glacial cycles, Concept of morphometric regions, Topography developed over folded and faulted structures. Brief idea about applied geomorphology.

**Books recommended:**

**Remote Sensing:**

1. Pande: Principles and applications of Photogeology.
2. Sabins: Remote sensing Principles and interpretations.

3. Lillesand and Kiefer: Remote sensing and image interpretation.
4. Drury: Image interpretation in Geology.

**Geomorphology:**

1. Savindrasingh (1998): Geomorphology, Prayag Pushpak Bhavan, Allahabad.
2. Thornbury William D.: Principles of Geomorphology, Wiley Eastern Reprint 1984.
3. Negi B.S.: Geomorphology, Kedernath Ramnath, Meerut.
4. Sharma V.K.: Geomorphology, Earth processes and forms, Tata McGraw Hill Publishing Co., New Delhi.
5. Worcester P.G.: Text book of Geomorphology.

**Practicals**

**ECONOMIC GEOLOGY**

Study of physical properties and identification of the following minerals in handspecimen: Native gold, Native Copper, Chalcopyrite, Bornite, Covellite, Cuprite, Malachite, Azurite, Galena, Anglesite, Cerrusite, Sphalerite, Zincite, Smithsonite, Hematite, Magnetite, Siderite, Pyrite, Marcasite, Pyrrhotite, Chromite, Pyrolusite, Psilomelane, Braunite, Ilmenite, Wolframite, Scheelite, Cassiterite, Molybdenite, Stibnite, Realgar, Orpiment, Cinnabar, Uraninite, Bauxite, Graphite, Asbestos, Barytes, Mica, Talc, Monazite, Beryl, Kyanite, Sillimanite, Gypsum, Clay, Lignite, bituminous coal and Anthracite

**Remote Sensing:**

Test of stereoscopic vision. Handling of aerial photographs. Aerial photo index. Orientation of stereopairs. Stereoviewing on aerial photos in conjunction with relevant toposheets. Significance of scale and resolution factors. Study of aerial photo expression of structural, geomorphic and lithologic features on stereopairs.

**Geomorphology:**

Reading of topographic maps. Scheme of numbering of topographic maps. Data provided on topographic maps. Drainage patterns and their relationship to lithology and structure. Computation of gradient of a stream. Contour patterns related to different topographic forms such as valleys, ridges (mesa, cuesta, homoclinal ridge, hogback), scarps, domes, basins, waterfalls, slopes, plains, gorges, plateaus, sand dunes. Contour patterns related to structures such as horizontal, dipping and folded beds, plunging folds. Contour patterns of igneous, sedimentary and metamorphic rocks.