

कोल्हान विश्वविद्यालय, चाईबासा  
*KOLHAN UNIVERSITY, CHAIBASA*



भूगर्भशास्त्र

**University Department of  
Geology**

**CBCS Syllabus Of B.Sc.  
Programme**

(Semester System)

W.E.F Session 2017-20

# SYLLABUS FOR B.SC. PROGRAMME

## First Semester

**DSC- A Theory**

**Full Marks -70**

**4 Credit**

### **Introductory Geology**

Science of Geology- its aims, applications and various branches. Earth as a planet- its size, shape, and structure. Elementary knowledge of the Earth's atmosphere, hydrosphere and lithosphere. Origin of the Earth. Age of the Earth.

### **Structural Geology**

Elementary Concepts of stratification and bedding. Dip and strike, clinometers compass. Out crops and effects of topography on outcrop.

### **Practical**

**Full Marks – 30**

**2 Credit**

1. Study of simple geological maps from No 1 to 8 involving simple Dip, Fold, Fault and Unconformity, Drawing of geological sections and detailed geological description.
2. Determination of Dip and strike from a given plane.
3. Record of laboratory works, Viva-voce, and field work.

### **Books Recommended**

- A text book of Geology – P.K.Mukerjee
- Structural Geology – M.P.Billings

# Second Semester

**DSC-B Theory**

**Full Marks – 70**

**4 Credit**

## **Physical Geology**

Surface processes and geological agencies. Weathering and erosion. Geological work of river, glacier, wind, lake and underground water.

## **Crystallography**

Definition of crystals and idea of its general features, faces, edges, solid angles etc. Symmetry elements. Laws of crystallography. Contact Goniometer and its uses. Crystallographic axis and axial ratio. Crystal notations- Parameter, indices and symbol.

## **Practical**

**Full Marks – 30**

**2 Credit**

1. Crystal drawing of the following forms- cube, Octahedron, Rhomb- dodecahedron, Zircon, Visuvianite, Prism, and Pyramids of 1<sup>st</sup> & 2<sup>nd</sup> order of Tetragonal system.

2. Field work. The field work will be carried out under supervision of a teacher of the Department of Geology.

3. Record of laboratory works, Viva-voce.

## **Books Recommended**

- A text book of Geology – P.K.Mukerjee
- A Text book of Engineering and General Geology – Prabin Singh
- Rutley's Element of Mineralogy --- H.H.Read

# Third Semester

**DSC- C Theory**

**Full Marks – 70**

**4 Credit**

## **Optical Mineralogy**

Elementary concepts of Propagation of light. Double refractions and polarization. Construction of Nicol Prism. Petrological microscope-its construction and function. Optical properties of minerals such as R.I, Relief, Birefringence, Pleochroism, Interference colours. Extinction and Extinction angles. Optic sign of uniaxial and biaxial minerals.

## **Hydrogeology**

**Practical**

**Full Marks – 30**

**2 Credit**

1. Identification of the following minerals under the microscope- Quartz, Orthoclase, Microcline, Plagioclase, (Albite and Anorthite), Biotite, Muscovite, Augite, Diopside, Hornblende.
2. Pleochroic scheme of biotite and hornblende.
3. Record of laboratory works, Viva-voce.
4. Practical related to Hydrogeology.

Hydrological cycle. Types of aquifers, water table and perched water. Artesian wells and springs. Ground water conditions in soft and hard rocks areas, Conservation of ground water.

### **Books Recommended**

- A text book of Geology – P.K.Mukerjee
- A Text book of Engineering and General Geology – Prabin Singh
- Rutley's Element of Mineralogy --- H.H.Read
- Optical Mineralogy-Pramod K Verma
- Mineralogy- Berry, Mason , Dietrich
- . Ground Water Hydrology-D. K. Todd

# Fourth Semester

**DSC- D Theory**

**Full Marks 70**

**4 Credit**

## **Descriptive Mineralogy**

Minerals- its definitions, and physical properties such as Form, Structure, colour, streak, Lustre, Hardness, specific gravity, Cleavage, Fracture, etc. Ionic bonds, Co-ordination number, Polymorphism, Isomorphism and pseudomorphism. Twinning and Twinning laws, important types of twinning. Elementary ideas of structure of silicates. Mineralogy of important groups of rock forming minerals- Quartz, Feldspar, Pyroxenes, Amphiboles, Olivine, & Mica. Study of Physical properties, Chemical composition, and mode of occurrence of the followings minerals- Talc, Gypsum, Calcite, Fluorite, Apatite, Topaz, Corundum, Beryl, Barite, Kyanite, Sillimanite, Epidote, Garnet ,Tourmaline, Andalusite, Zircon and Sphene.

## **Field Geology**

General idea of field Geology, Field equipments, study of topographic and Geological maps. A brief idea of geological mapping.

## **Practical**

**Full Marks – 30**

**2 Credit**

1. Practical study of all the physical properties of a mineral such as Hardness Scale, Different types of fractures, cleavage, colour etc.

2. Identification of the following minerals in hand specimen- Quartz, Orthoclase, Microcline, Plagioclase, (Albite and Anorthite), Biotite, Muscovite, Augite, Diopside, Tremolite, Actinolite, Hornblende, Beryl, Barite, Kyanite, Sillimanite, Garnet, Tourmaline, Epidote, Andalusite, Zircon, Sphene, and Nepheline

## **Books Recommended**

- A text book of Geology – P.K.Mukerjee
- A Text book of Engineering and General Geology – Prabin Singh
- Rutley's Element of Mineralogy --- H.H.Read
- Optical Mineralogy-Pranod K Verma
- Mineralogy- Berry, Mason , Dietrich

# Fifth Semester

**DSE – A Theory**

**Full Marks – 70**

**4 Credit**

## **Igneous Petrology**

Magma, nature, composition and origin. Structure, texture, and classification of igneous rocks. Bowen's reaction series and its significance.

## **Metamorphic Petrology**

Agents and types of metamorphism. Texture and structure of metamorphic rocks. Brief idea of Zone grade and facies.

## **Stratigraphy**

Principles of stratigraphy. Geological time scale. Physiographic division of India. A brief account of the important geological formation of India viz. Precambrian of Jharkhand, Cuddapahs of Andhra Pradesh, Vindhya of central India and Gondwana of Damodar valley.

## **Sedimentology**

Formation of sedimentary rocks. Structure and Texture of Sedimentary rocks. Classification of sedimentary rocks. Provenance- study of heavy minerals in the study of provenance.

## **Paleontology**

Fossils and processes of fossilization. Elementary ideas about origin and evolution of life. Morphology and geological distribution of Brachiopods, Lamellibranchia, Gastropoda, and Trilobita.

## **Practical**

**Full Marks – 30**

**2 Credit**

1. Megascopic and microscopic identification of following rocks: Granite, Pegmatite, Gabbro, Basalt, dolerite, Nepheline, synite, Slate, Phyllite, different variety of Gneisses and Schists, Marble, Quartzite, and Khondalite.
2. Field visit for seven days in any sedimentary basin of Jharkhand. Record and Viva –voce
3. Plotting of important Geological horizons on the outline map of India
4. Megascopic and microscopic identification of following rocks: Sandstone, Conglomerate, Breccia, Limestone, Shale
5. Identification of important invertebrate and plant fossils.
6. Record of laboratory, field- work and viva-voce.

## **Mining geology and Exploration**

Geological, geochemical and geophysical methods of mineral exploration. Mining Methods – underground and open cast.

### **Books recommended**

1. Mining Geology- R. N. P. Arogyaswam
2. Petrology –G. W. Tyrrell
3. Sedimentary Rocks- F.J. Pettijohn
4. Fundamental of Historical Geology- Ravinder Kumar
5. Invertebrate Paleontology- H. Woods

## **Sixth Semester**

**DSE- B Theory**

**Full Marks – 70**

**4 Credit**

### **Economic Geology**

Definition of ore and ore minerals. Processes of mineral formation. Brief study of iron ore, copper ore, aluminium ore, mica, coal, petroleum and radioactive minerals of India.

### **Environmental Geology**

General idea of ecology and environment. Impact of mining and related industries on environment. Water and air pollution.

### **Survey Methods**

The Plane-table method. Mapping techniques, Field indicators of minerals, rocks and structure.

### **Photo Geology**

Elementary idea of Photogeology. Aerial photography, types of aerial cameras and flight planning. Human eye and stereoscopic vision, depth perception. Stereoscopes- their types, construction and function. Geometric characteristics of aerial photographs

**Practical**

**Full Marks – 30**

**2 Credit**

1. Plotting of important Geological horizons on the outline map of India containing ore deposits.
2. Megascopic study of iron ores, copper ores, aluminium ore, mica minerals, chromite, asbestos etc.
3. Plotting of polluted cities of Jharkhand due to mining on the outline map of India
4. Plotting of polluted rivers of Jharkhand due to mining on the outline map of India
5. Plotting of data through Plane table survey

6. Visual interpretation of aerial photographs and satellite images. Determination of scale of the photographs and images.
7. Record and viva-voce

**Books Recommended**

1. Economic Geology- U. Prasad
2. Environmental Geology - Keller
3. Field geology- F H Lahee
4. Fundamentals of Remote Sensing and GIS- S K Sinha