

DEPARTMENT OF GEOLOGY

COURSE CURRICULUM & MARKING SCHEME

B.Sc. PART – II & III GEOLOGY

SESSION : 2022-23



ESTD: 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. Geology 2022 – 2023

**Approved syllabus for B.Sc. -II GEOLOGY by the members of Board of Studies for
the Session 2022 -23**

The syllabus for B.Sc.- II Geology is hereby approved for the session 2022 -23.

Program Outcomes - B.Sc. Geology

The student graduating with the Degree B.Sc. Geology will be able to:

1. Acquire a solid base of knowledge in the science of geology as a whole as well as earth materials, earth history, sedimentation and stratigraphy, deformational processes and structural features, and geomorphic processes and landforms
2. Understand the geologic time scale and place important geologic events in a temporal framework
3. Demonstrate the ability to use Clinometers and Brunton compass, and images in geological investigations
4. Understand the pathways and influence of water and other fluids at Earth's surface and in the subsurface
5. Interpret topographic maps and terrain models and create profiles
6. Interpret geologic maps and construct cross sections from them
7. Distinguish between various structural features and determine the types of stress responsible for their formation
8. Describe and interpret types of surficial deposits and landforms
9. Apply principles of mathematics, chemistry, and physics to geologic problems
10. Develop proficiency in oral and written communication of geologic concepts.



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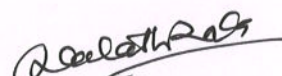
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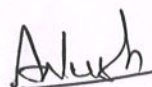


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B.Sc. Geology 2022 – 2023

Syllabus and Marking Scheme for B.Sc. Part – II Geology

Paper No.	Title of the Paper	Marks Allotted in Theory	
		Max	Min
I	Petrology	50	17
II	Structural Geology	50	17
	Practical	50	17
	Total	150	

02 Theory papers	-	100
01 Practical	-	50
Total Marks	-	150

Course Outcome Paper-I Petrology

On completion of Course, the students should be able to

1. Discuss about the formation of igneous rocks, their texture and structures
2. Explain about forms and classification of igneous rocks
3. Identify, describe and classify sedimentary rocks using hand specimens
4. Describe the formation of sedimentary rocks, their textures and structures
5. Explain about the formation of metamorphic rocks, their texture and structure
6. Identify and classify various types of metamorphic rocks.
7. Explain the concept of metamorphic facies, ACF, AKF and AFM diagrams



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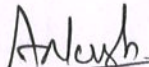

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B.Sc. Geology 2022 – 2023

B.Sc. Part – II GEOLOGY
COURSE CODE: - BGL 03, PAPER-I
PETROLOGY

- UNIT-I (i) Magma, definition, origin & composition
(ii) Bowen's reaction series, magmatic differentiation & assimilation
(iii) System, phases & component, principles of thermodynamics, Crystallization and phase equilibrium of unicomponent magma :(Silica), Bi-component magma: Albite-Anorthite and Diopside-Anorthite Tri-component magma: Diopside-Albite-Anorthite
(iv) Textures, structures & classification of igneous rocks
(v) Forms of igneous rocks
- UNIT-II (i) Rock association in Time & Space, concepts of rock kindreds
(ii) Petrographic studies of Acid igneous rocks.
(iii) Petrographic studies of Alkaline igneous rocks
(iv) Petrographic studies of Basic igneous rock
(v) Petrographic studies of Ultrabasic igneous rocks.
- UNIT-III (i) Origin, transportation & deposition of sediments
(ii) Dynamics of sedimentary depositional environment; Aeolian, fluvial, coastal and abyssal environment.
(iii) Concept of sedimentary facies
(iv) Concept of diagenesis
(v) Textures & structures of sedimentary rocks.
- UNIT-IV (i) Classification of sedimentary rocks.
(ii) Petrography of sedimentary rock; rudaceous, arenaceous, calcareous sedimentary rocks
(iii) Metamorphism; definition, agents, facies & grade
(iv) Textures, structures & classification of metamorphic rocks.
(v) Equilibrium & non-equilibrium reactions in metamorphism.
- UNIT-V (i) Paragenetic diagrams; projective analysis A.C.F & A.K.F. diagrams
(ii) Progressive metamorphism of Argillaceous rocks.
(iii) Progressive dynamo-thermal metamorphism of impure limestone.
(iv) Progressive dynamo-thermal metamorphism of basic igneous rocks.
(v) Petrographic provinces of India.



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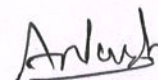


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B.Sc. Geology 2022 – 2023

Question Paper Format and Distribution of Marks for Under Graduate Examination

1. The question paper for UG Classes is to be divided into three Sections - A, B & C.
2. Section A shall contain very short answer type questions (answer in one or two sentences) or objective type questions. (No Multiple choice questions. No 'fill in the blank' type Questions)
3. Section B shall contain short answer type questions with the limit of 150 words.
4. Section C shall contain long answer/descriptive type questions. The students are required to answer precisely and the answer should not exceed the limit of 350 words.
5. The scheme of marks should be as follows :


Question Type	MM 50 (Marks X No.of Q.)
A (Very short Ans.)	1x10 = 10
B (Short Ans.)	3x5 = 15
C (Long Ans.)	5x5 = 25

6. The half yearly internal examinations will be held. 10% out of marks obtained by the students in each paper in internal examinations will be added to 90% of marks obtained in each paper of annual examination.

Course Outcome Paper-II Structural Geology

On completion of Course, the students will be able to

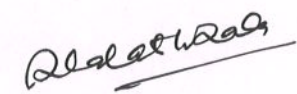
1. Explain about parts of fold and classify various folds
2. Recognize and classify the faults in the field and on geological map
3. Identify and classify Unconformities
4. Discuss about various types of Joints
5. Demonstrate the origin of foliation and lineation
6. Identify the top and bottom of rock beds in a series of rocks


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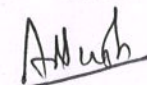

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B.Sc. Part – II GEOLOGY
COURSE CODE: - BGL04, PAPER-II
STRUCTURAL GEOLOGY

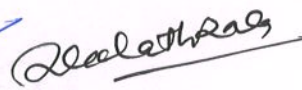
- UNIT-I (i) Definition and scope of Structural Geology. Study of outcrops. Effects of dip and slope on outcrops.
(ii) Identification of bedding. Dip and strike measurement.
(iii) Clinometers and Brunton compass.
(iv) Recognition of top and bottom of beds.
(v) Concept of rock deformation. Concept of stress and strain ellipsoids.
- UNIT-II (i) Fold morphology.
(ii) Geometric and genetic classification of folds.
(iii) Recognition of folds in the field and on geological maps.
(iv) Effect of folds on outcrops.
(v) Elementary idea of mechanics of folding.
- UNIT-III (i) Fault morphology. Slip and separation.
(ii) Geometric and genetic classification of faults.
(iii) Recognition of faults in the field and on geological maps.
(iv) Effect of faults on outcrops.
(v) Elementary idea of mechanics of faulting.
- UNIT-IV (i) Joint morphology; geometric and genetic classification of joints.
(ii) Foliation; terminology, kinds, origin and relation to major structures.
(iii) Lineation: terminology, kinds, origin and relation to major structures.
(iv) Salt domes.
(v) Plutons; tectonics & emplacement.
- UNIT-V (i) Types and recognition of Unconformity.
(ii) Outlier and inlier. Overlap & offlap.
(iii) Concept of tectonics.
(iv) Tectonic framework of Peninsula, Indo-Gangetic Plains and Extra-Peninsular India.
(v) Stereographic projection & its use in Structural Geology.


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Question Paper Format and Distribution of Marks for Under Graduate Examination

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4. Section C shall contain long answer/descriptive type questions. The students are required to answer precisely and the answer should not exceed the limit of 350 words.
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Question Type	MM 50 (Marks X No.of Q.)
A (Very short Ans.)	1x10 = 10
B (Short Ans.)	3x5 = 15
C (Long Ans.)	5x5 = 25

6. The half yearly internal examinations will be held. 10% out of marks obtained by the students in each paper in internal examinations will be added to 90% of marks obtained in each paper of annual examination.

Course Outcome B.Sc. Part-II Geology Lab Course

On completion of this course, the students will be able to

1. Analyze the contour maps and assess the strike and dip using Clinometers and Brunton compass
2. Compute the thickness of the outcrops
3. Identify the true and apparent dip through trigonometrical calculation and graphical method
4. Construct geological cross section from given geological map
5. Identify igneous, sedimentary and metamorphic rocks in hand specimen
6. Describe microscopic properties of igneous, sedimentary and metamorphic rocks

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B.Sc. Part - II PRACTICAL

COURSE CODE: - BGLP 02

M.M. 50

LABORATORY WORK:

M.M. 40

1. Preparation of profile, cross section and geological history in geological maps. Completion of outcrops.
2. Description of structures present in natural hand specimens and artificial structural models with the help of diagrams.
3. Megascopic and microscopic study of important igneous, sedimentary and metamorphic rocks.

GEOLOGICAL FIELD WORK:

M.M. 10

10 days of actual geological mapping and visit to economical mineral deposits in some appropriate area followed by collection of samples of rocks, ores and fossils during the field work.



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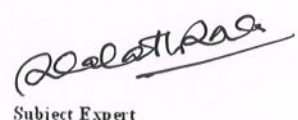
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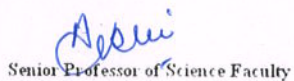
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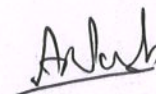


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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – III Geology 2022 – 2023

**Approved syllabus for B.Sc.-III GEOLOGY by the members of Board of Studies for
the Session 2022 -23**

The syllabus for B.Sc.- III Geology is hereby approved for the session 2022 -23.

Program Outcomes - B.Sc. Geology

The student graduating with the Degree B.Sc. Geology will be able to:

1. Acquire a solid base of knowledge in the science of geology as a whole as well as earth materials, earth history, sedimentation and stratigraphy, deformational processes and structural features, and geomorphic processes and landforms
2. Understand the geologic time scale and place important geologic events in a temporal framework
3. Demonstrate the ability to use Clinometers and Brunton compass, and images in geological investigations
4. Understand the pathways and influence of water and other fluids at Earth's surface and in the subsurface
5. Interpret topographic maps and terrain models and create profiles
6. Interpret geologic maps and construct cross sections from them
7. Distinguish between various structural features and determine the types of stress responsible for their formation
8. Describe and interpret types of surficial deposits and landforms
9. Apply principles of mathematics, chemistry, and physics to geologic problems
10. Develop proficiency in oral and written communication of geologic concepts.

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B.Sc. – III Geology 2022 – 2023

Syllabus and Marking Scheme for B.Sc. Part – III Geology

Paper No.	Title of the Paper	Marks Allotted in Theory	
		Max	Min
I	Palaeontology & Stratigraphy	50	17
II	Earth Resources & Applied Geology	50	17
	Practical	50	17
	Total	150	

Theory papers - 100
01 Practical - 50
Total Marks - 150

Course Outcome Paper I: Palaeontology & Stratigraphy

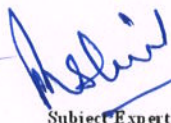
At the end of the course, the students will be able to

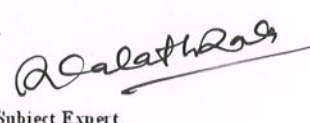
1. Understand the principles of Stratigraphy and details of Geological Time scale
2. Identify Indian stratigraphic systems of Archean, Dharwar, Cuddapah, Kurnool, Vindhyan and Aravalli Supergroups
3. Describe the Geological Time events of The Paleozoic, Gondwana, Triassic, Jurassic and Cretaceous and the Tertiary Group
4. Understand the detailed significance of the Siwalik, Pleistocene, Holocene, Himalayas, and Eocene systems.
5. Analyze the age and boundary problems of various ages.
6. Describe morphology, geological distribution and evolution of Brachiopods, Lamellibranches, Trilobites, Gastropods, Graptolites and Echinoids.


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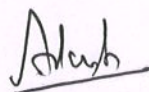

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B.Sc. – III Geology 2022 – 2023

B.Sc. Part – III GEOLOGY
COURSE CODE: - BGL-05, PAPER - I
PALAEONTOLOGY & STRATIGRAPHY

- UNIT-I (1) Palaeontology: Fossils- definition, Essentials for fossilization, modes of fossilization.
(2) Uses of fossils; Index fossils & their significance.
(3) Application of palaeontology in the study of Stratigraphy, Palaeoecology and Palaeo-geography.
(4) Micro palaeontology & its significance.
(5) Study of plant fossils & their significance.
- UNIT-II (1) Morphology & geologic distribution of foraminifera & Anthozoa fossils.
(2) Morphology & geological distribution of Gastropoda and Lamellibranchia fossils.
(3) Morphology & geological distribution of Cephalopoda.
(4) Morphology & geological distribution of Echinoidea & Brachiopoda fossils.
(5) Morphology & geological distribution of Trilobite and Graptolite fossils.
- UNIT-III (1) Principles of stratigraphy: Geological time scale.
(2) Basic concept of lithostratigraphic, chronostratigraphic & biostratigraphic units.
(3) Structural & physical subdivision and characteristic features of Indian subcontinent.
(4) Distribution, classification & economic importance of Archaeozoic rocks of India (Dharwar)
(5) Distribution, Stratigraphy & Economic Importance of Bastar & Raoghat group of rocks (Chhattisgarh)
- UNIT-IV (1) Distribution, stratigraphy & Economic importance of Vindhyan & Chhattisgarh supergroup of rocks.
(2) Stratigraphy, Palaeoclimate, Geographical distribution & economic aspects of Gondwana Supergroup.
(3) Stratigraphy, Distribution & age of Deccan Traps.
(4) Stratigraphy, Distribution & fossil contents of Bagh & Lameta Bed.
(5) Distribution, Stratigraphy & Palaeontology of Salt Range group of rocks.
- UNIT-V (1) Distribution, Stratigraphy & Economic importance of Palaeozoic rocks of Spiti Valley.
(2) Stratigraphy, Distribution, Fossil content of Cretaceous rocks of Tiruchirapalli.
(3) Stratigraphy, Distribution, Fossil content & Economic importance of Jurassic rocks of Kutch-Region.
(4) Distribution, Stratigraphy, Economic importance of Tertiary rocks of Assam-Region.
(5) Distribution, Stratigraphy & Vertebrate Palaeontological importance of Siwalik group of rocks.




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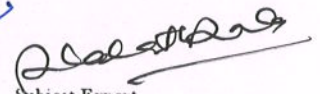
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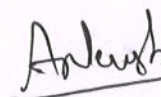


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B.Sc. – III Geology 2022 – 2023

Suggested Readings:

- Clarkson, E.N.K., 1998: Invertebrate Palaeontology and Evolution. IV Ed. Blackwell.
Jain, P.C., and Anantharaman, M.S., 1996 : Palaeontology – Evolution and animal distribution. Vishal Publications.
Prothero, D.R., 1998: Bringing fossils to life- An Introduction to Palaeobiology. McGrawHill.
Stearn, C.W. and Carrol, R.L., 1989: Palaeontology- the record of life. John Wiley.
Boggs Sam Jr., 1995: Principles of Sedimentology and Stratigraphy. Prentice Hall.
Kumar, Ravindra, 1985 : Fundamentals of Historical Geology and Stratigraphy of India. Wiley Eastern Ltd.
Naqvi, S.M. and Rogers, J.J.W, 1987: Precambrian Geology of India. Oxford University Press.

Question Paper Format and Distribution of Marks for Under Graduate Examination

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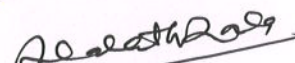
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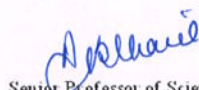
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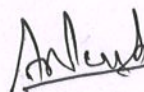


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Course Outcome Paper II: Earth Resources & Applied Geology

On completion of Course, the students will be able to

1. Explain about the classification and processes of formation of mineral deposits
2. Discuss the distribution of mineral resources in India
3. Describe the origin, occurrence and distribution of Coal, petroleum and radioactive minerals
4. Discuss the fundamentals of Engineering Geology, Photogeology and Hydrogeology
5. Explain about various aspects of mineral exploration and the mineral policy of India.

B.Sc. Part – III GEOLOGY

COURSE CODE:- BGL-06, PAPER – II

EARTH RESOURCES & APPLIED GEOLOGY

UNIT-I (1) Economic Geology introduction & its perspectives; Global mineral deposit & resource. Distribution of mineral deposits in time & space.

(2) Classification of mineral deposits. Geological thermometers.

(3) Magmatic & Hydrothermal processes of mineral formation.

(4) Weathering products & Residual deposits. Oxidation & supergene sulphide enrichment processes.

(5) Sedimentary processes of ore formation. Placer deposits.

UNIT-II Geological, Geographical distribution, mode of occurrence, mineralogy & economic importance of following metallic & nonmetallic deposits of India.

(1) Iron, Manganese, Chromium

(2) Copper, Lead, Zinc

(3) Gold, Aluminium

(4) Refractory and Fertilizer minerals

(5) Minerals used in cement & chemical industries.

UNIT-III (1) Coal deposits: Origin, Definition & stratigraphy

(2) Fundamentals of coal petrography. Peat, Lignite, Bituminous & Anthracite. Indian coal deposits with special reference to Coal deposits of Chhattisgarh.

(3) Origin of Natural-hydrocarbons, migration & accumulation. Types of oil traps; Structural, stratigraphic and composite. Offshore & Onshore oil deposits of India.

(4) Radioactive minerals: Mineralogy, Geochemistry, Prospecting techniques, Geological & Geographical distribution of atomic-minerals.

(5) Principles of mineral economics. National mineral policy.

UNIT-IV (1) Engineering Geology & its importance, Engineering properties of rocks

(2) Geological conditions for construction of large Dams and Tunnels.

(3) Elementary study of Aerial photographs & satellite imageries. Application of remote sensing techniques in town-planning.

(4) Hydrologic cycle. Mode of occurrence of ground water, quality of ground water.

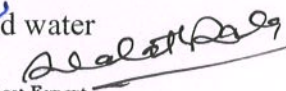
(5) Hydrologic properties of rocks. Classification of Aquifers. Ground water

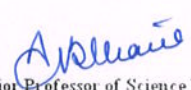

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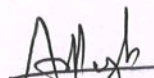

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provinces of India.


- UNIT-V** (1) Introduction to mineral exploration, Surface & subsurface methods of mineral Exploration.
(2) Prospecting methods; Drilling, Sampling & Assaying.
(3) Geophysical prospecting techniques: Gravity, Electrical & Magnetic methods.
(4) Aerial and seismic prospecting methods.
(5) Environmental impact of over exploitation of mineral resources.

Suggested Readings:

- (1) आर्थिक भूविज्ञान- कृष्ण गोपाल व्यास
- (2) आर्थिक एवं व्यावहारिक भूविज्ञान- आर.पी. मांजरेकर
- (3) भौमजल विज्ञान- एल.के. रिछारिया
- (4) प्रारंभिक खनिकी- बी.के. सिंह
- (5) प्रायोगिक भूविज्ञान भाग-3- गुप्ता, पुनवटकर एवं रघुवंशी
- (6) Economic mineral deposits of India- Umeshwar Prasad.
- (7) Economic mineral deposits- A.Bateman
- (8) Ore-deposit of India- Gokhale & Rao
- (9) India's Mineral Resource- S. Krishnaswami
- (10) Principles of Engineering Geology & Geotechniques- Krynine & Judd.
- (11) Groundwater Hydrology- D.K. Todd
- (12) Courses in Mining Geology- R.N.P. Arogyaswami
- (13) Principles & Applications of photogeology- S.N. Pandey.
- (14) Ground water- Assessment, Development & Management- K.R. Karanth
- (15) Geophysical methods in Geology- P.V. Sharma.
- (16) Environmental Geology- K.S. Valdiya (1987)


Question Paper Format and Distribution of Marks for Under Graduate Examination

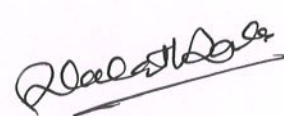
1. The question paper for UG Classes is to be divided into three Sections - A, B & C.
2. Section A shall contain very short answer type questions (answer in one or two sentences) or objective type questions. (No Multiple choice questions. No 'fill in the blank' type Questions)
3. Section B shall contain short answer type questions with the limit of 150 words.
4. Section C shall contain long answer/descriptive type questions. The students are required to answer precisely and the answer should not exceed the limit of 350 words.
5. The half yearly internal examinations will be held. 10% out of marks obtained by the
6. students in each paper in internal examinations will be added to 90% of marks obtained in each paper of annual examination.


Chairperson /H.O.D

Subject Expert


Subject Expert


Subject Expert

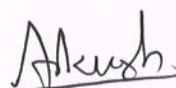

Subject Expert


Senior Professor of Science Faculty

Departmental members

Alumnus

Alumnus



DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – III Geology 2022 – 2023

7. The scheme of marks should be as follows :

Question Type	MM 50 (Marks X No.of Q.)
A (Very short Ans.)	1x10 = 10
B (Short Ans.)	3x5 = 15
C (Long Ans.)	5x5 = 25

B.Sc. Part – III PRACTICAL

COURSE CODE: - BGLP03

M.M. 50

Course Outcome B.Sc. Part-III Geology Lab Course

On completion of Course, the students will be able

1. Identify ore forming minerals in hand specimen.
2. Demarcate ore deposits and economic mineral deposits in Outline map of India.
3. Estimate the ore reserves from the given data.
4. Interpret aerial photographs with the help of stereoscope.
5. Visually interpret satellite Imageries.
6. Construct and interpret water table maps on the basis of given data
7. Identify various invertebrate and plant fossils on the basis of their morphological characters


Practical Exercises -

- (1) Study of important metallic and nonmetallic minerals on the basis of physical & optical properties.
- (2) Distribution of important metallic and nonmetallic deposits within outline map of India.
- (3) Macroscopic studies of coal & its varieties.
- (4) Exercises related to mineral exploration; Reserve calculation, Tonnage factor calculation, Exercises related to drilling.
- (5) Study of Aerial photographs with the help of stereoscope.
- (6) Study of satellite imageries.
- (7) Study of hydrologic properties of rocks, Preparation of hydrogeological maps.
- (8) Geological excursion for ten days.
- (9) Identification of various invertebrate and plant fossils on the basis of their morphological characters.
- (10) Plotting of various localities exhibiting rocks belonging to various ages on the outline map of India


Chairperson / H.O.D

Subject Expert


Subject Expert


Subject Expert


Subject Expert


Senior Professor of Science Faculty

Departmental members

Alumnus

Alumnus

