

Revised Syllabus in Geology
B.Sc.II Year
Subject: - Geology
DESCRIPTIVE MINERALOGY AND STRUCTURAL GEOLOGY
Paper No.-IV
Total Period 75 Hrs

A) Descriptive Mineralogy

UNIT-I Optical Mineralogy : (25 Hrs)

Introduction to petrological microscope. Nature of Light reflection, refraction, double refraction, total internal reflection and critical angle. Nicol's prism, position of extension, and extinction angle isotropism and anisotropism, isotropic and anisotropic minerals. Birefringence, refractive index, use of accessory plates, compensation and determination of interference colour. Newton's scale, determination of sign of elongation where 'C' axis is known. Vibration direction and optic orientation, anomalous colours, pleochroism and absorption. Uniaxial and biaxial interference figures and determination of optic sign of uniaxial and biaxial minerals.

Methods of determination of refractive index ;Central illumination method and Oblique illumination method. Study of optical properties of minerals.

B) UNIT-II-Mineral Groups : (20Hrs)

Introduction to mineral, silicate structure, isomorphism, polymorphism and pseudomorphism. Classification of minerals. Study of structure, Chemistry, physical and optical properties, paragenesis and uses of the following mineral groups: Olivine, garnet, alumino-silicate, pyroxene, amphibole, mica, silica, feldspar, feldspathoid, oxides and sulphides.

C) UNIT – III- Structural Geology : (25Hrs)

Introduction, Attitude of beds, strike and dip, study of clinometers compass, Brunton compass and its application in the field survey.

Fold: Parts of fold, nomenclature of folds, plunge of folds, types of fold field study of folds, determination of top of beds by primary features.

Fault: General characteristic of fault, types of movement, classification of fault based on genetic, net slip, attitude of faults relative to attitude of beds, fault pattern and value of dip of fault. Criteria for reorganization of fault such as discontinuity of strata, repetition and omission of beds, feature characteristic of fault plane and physiographic criteria.

UNIT – IV Joint

(5Hrs)

Introduction, Genetic and geometric classification of joints.

Unconformity : Introduction, general significance of unconformity. Types of unconformities such as disconformities, angular unconformity, non-conformity, local unconformity, over lap, off lap, overstep, outlier and inlier.

Lineation and Foliation : Introduction, descriptive terminology, kinds origin and relation to major structures.

B.Sc. IInd Year
Subject: - GEOLOGY
PAPER – V Petrology
Total Periods 75 Hrs.

UNIT – I Igneous Petrology : (25 Hrs)

Formation of glass and crystal. Crystallisation of unicomponent magma. Crystallisation of binary magma, eutectics, mixed crystals. Crystallization of Ternary magma. Reaction relation and Bowen's reaction series. Textural characters Such as granularity, shape of the crystal, mutual relation of crystals, textures and their types. Microstructures Structures of igneous rocks. Classification of igneous Rocks. Theories of differentiation and assimilation. Crystallisation of Granitic and Basaltic magma.

UNIT-II- Sedimentary Petrology : (20 Hrs)

Formation of sediments and different types of depositional environment Such as eolian, fluvial and sea environment. Mineral composition of sedimentary Tocks. Textural characters such as grain size, sphericity, roundness, shape. Mechanical, chemical and organic structures. Maturity of sediments Heavy Minerals. Mineralogy, Texture, Structure and Classification of conglomerate, sand stones and lime stones.

UNIT – III Metamorphic Petrology : (20 Hrs)

Kinds if metamorphism. Concept of depth zones, Facies and grades of Metamorphism. Eskola's concept of metamorphic facies pressure-Temperature Diagram. Metamorphic minerals (stress and antistress minerals) Texture and structure of metamorphic rocks. Classification of metamorphic rocks. Process of formation of metamorphic rocks such as cataclastic Metamorphism, thermal metamorphism, dynamothermal metamorphism, plutonic Metamorphism and their products. Metasomatism, pneumatolytic metamorphism, injection metamorphism and

Autometamorphism. Lit-per-lit gneiss, composit gneiss. Anatexis and palingenesis.

UNIT – IV (10 Hrs)

Study of common rocks of Igneous, Sedimentary and metamorphism origin.

B.Sc. IInd Year
Practical Paper – VI
(Based on Theory Paper No-IV)

Total Marks : 100

- A) Study of Optical Properties of Following Minerals :
Quartz, orthoclase, microcline, plagioclase, augite, hypersthene, Hornblende, actinolite, olivine, muscovite, biotite, garnet, calcite, chlorite, Kyanite, Sillimanite and andalusite.
- B) Newton's scale of interference colors, Determination of sign of elongation.
Determination of optic sign of uniaxial/biaxial minerals.
- C) Calculation of Hess Metasilicate of Pyroxene Minerals.
- D) Study of Structural Geological Maps Covering Faults, Unconformity, Folds and Dykes.
- E) Orthographic and Stereographic Methods of Solving Structural Problems.

B.Sc. II Year
Practical Paper – VII
(Based on Theory Paper No-V)

Total Marks: 100

- A) Study of Following Rocks in Hand Specimen:
Graphic granite, Nepheline syenite, and its varieties, Obsidian, Pumice, Andesite, pegmatite, Porphyritic granite, Granodiorite. Graded sandstone, Current bedded sandstone, Grit, Sandstone with ripple Marks, Carbonaceous shale, Fossiliferous limestone, Shelly limestone, Breccia, Conglomerate, Arkose.
- B) Study of the Optical Properties of Following Rocks :
Igneous Rocks :- Granite, Syenite, Diorite, Gabbro, Dunite, Rhyolite, Trachyte, Andesite, Basalt.
Sedimentary Rocks :- Sandstone, Limestone, Breccia, Conglomerate, Oolitic limestone, Fossiliferous limestone, Quartzite, Shale.
Metamorphic Rocks :- Quartzite, Marble, Mica-Garnet schist, Actinolite schist, Sillimanite Schist, Gneiss, Granulite.
- C) Study of structures of Igneous, Sedimentary and Metamorphic Rocks in hand specimen.
- D) Preparation of Geological report based on field tour of four days duration.

Scheme of Marking of Theory Papers
Paper No. IV :Descriptive Mineralogy and Structural Geology 100 :Marks

Unit-I :	Optical Mineralogy	30 Marks
Unit II :	Mineral Groups	30 Marks
Unit III and IV :	Structural Geology,	40 Marks
Total		100 Marks

Paper – V Petrology Marks: 100

Unit I and IV	: Igneous Petrology ,	40 Marks
Unit II and IV	: Sedimentary Petrology,	30 Marks
Unit III and IV	: Metamorphism Petrology,	30 Marks
Total		100 Marks

Scheme of Marking for Practical Papers
Practical Paper – VI Marks: 100
(Baded on Theory Paper No. IV)

A) Optical Mineralogy	
1) Mineral thin section	15 Marks
2) Sign of Elongation/Optic sign	10 Marks
B) Mineralogy	
1) Minerals in Hand specimen	15 Marks
2) Hess Metasilicate	10 Marks
C) Structural Geology	
1) Maps	20 Marks
2) Structural Problems	10 Marks
3) Stereographic Problems	10 Marks
Record Book	10 Marks
Total	
100 Marks	

Practical Paper – VII
(Based on Theory paper No. V.)

Marks : 100

A) Igneous Petrology

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| 1) Hand Specimen | 10 Marks |
| 2) Thin section | 10 Marks |

B) Sedimentary Petrology

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|------------------|----------|
| 1) Hand specimen | 10 Marks |
| 2) Thin section | 10 Marks |

C) Metamorphic Petrology

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|------------------|----------|
| 1) Hand specimen | 10 Marks |
| 2) Thin section | 10 Marks |

D) Structures and Textures of

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| 1) Rocks in Hand Specimen | 15 Marks |
| 2) Field Report and Viva-Voce | 15 Marks |
| Record Book | 10 Marks |

Total : 100 Marks

Books Recommended for B.Sc. IInd Year Geology

	Title of Books	Name of Author's
1)	Optical Mineralogy	Paul. F..Kerr
2)	An Introduction to Rock forming Minerals	Deer,Howie And Zussman
3)	Optical Mineralogy	Phillips & Griffen
4)	Rutlay's Elements of Mineralogy	C.D. Gribble, 27 th Edn.
5)	Principles of Sedimentology	Friedman & Sanders
6)	Petrology of the Metamorphic Rocks	Roger Mason
7)	Structural Geology	M. P. Billing's
8)	Petrology of Sedimentary rocks	J. T. Greensimth
9)	Sedimentary Rocks	F.J. Pettijohn
10)	An Introduction to Sedimentology	S.R.Selley
11)	Introduction to Sedimentology	S.M. Sengupta
12)	Igneous Rocks	Alok Gupta
13)	Igneous and Metamorphic Petrology	Turner and Verhoogen
14)	Sedimentary Structures	J. D. Collinson & D.B. Thompson
15)	Layered Igneous rocks	L. R. wager and G.M. Brown
16)	Study of rocks in Thin sections	W.W. Moorhouse
17)	Petrology	G. W. Tyrrel

