S.R.T.M. University, Nanded
B.Sc. II Year
Subject: - Geology

Semester No.	Paper No.	Title of Paper	Units	Marks	Periods in Hrs.
III	VI	Optical & Descriptive Mineralogy	I & II	50	40
III	VII	Dynamics of Earth & Igneous Petrology	I & II	50	40
IV	VIII	Structural Geology	I & II	50	40
IV	IX	Sedimentary & Metamorphic Petrology	I & II	50	40

S.R.T.M. University, Nanded
B.Sc. II Year
Practical in Geology (Semester pattern)

Semester No.	Paper No.	Title of Paper	Marks
III	IX	Practical based on Theory papers VI &VII	50
IV	X	Practical based on Theory papers VIII & IX	50

B.Sc. II Year (Semester III)

Subject: - Geology
Paper - VI
OPTICAL AND DESCRIPTIVE MINERALOGY

Total Period 40 Hrs

Unit – I: Optical Mineralogy: (20 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.

Unit – II: Descriptive Mineralogy : (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, felspathoid.

B.Sc.II Year (Semester III)
Subject: - Geology
Paper - VII

DYNAMICS OF THE EARTH AND IGNEOUS PETROLOGY

Total Periods 40 Hrs.

Unit – I: Dynamics of the Earth (15 Hrs.)

Isostasy: Concept and theories of Isostasy, evidence of continental drift and sea-floor spreading. Origin and significance of Mid-oceanic ridges. Island arc and trench. Evolution of plate tectonic theories, nature and types of plate margins. Evolution of ocean and continents, Wilson cycle. Palaeomagnetism. Geosynclines.

Unit – II: 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 and structures of igneous rocks. Classification of igneous Rocks. Theories of differentiation and assimilation. Crystallisation of Granitic and Basaltic magma. Study of common igneous rocks.

B.Sc.II Year (Semester IV)
Subject: - Geology
Paper - VIII

STRUCTURAL GEOLOGY

Unit – I: (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.

Joint: Introduction, Genetic and geometric classification of joints.

Unit – II: (15Hrs)

Unconformity: Introduction, general significance of unconformity. Types of Unconformities such as disconformities, angular unconformity, non-conformity, Local unconformity, over lap, off lap, oversteps outlier and inlier.

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

B.Sc.II Year (Semester IV)
Subject: - Geology
Paper - IX

SEDIMENTARY AND METAMORPHIC PETROLOGY

Unit – I: Sedimentary Petrology: (20 Hrs)

Formation of sediments and different types of depositional environment Such as aeolian, fluvial and sea environment. Mineral composition of sedimentary rocks. 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. Study of common sedimentary rocks.

Unit – II: 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. Process of formation of metamorphic rocks such as cataclastic Metamorphism, thermal metamorphism, dynamothernmal metamorphism, plutonic Metamorphism and their products. Metasomatism, pneumatolytic metamorphism, injection metamorphism and Auto-metamorphism. Lit-per-lit gneiss, composite gneiss. Anatexis and palingenesis. Study of common metamorphic rocks.

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

Total Marks: 50

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 colours, Determination of sign of elongation. Determination of optic sign of uniaxial/biaxial minerals. Determination of vibration direction, pleochroism and refractive index

C) Calculation of Hess Metasilicate of Pyroxene Minerals.

D) Study of Following Rocks in Hand Specimen:

Granite and its varieties, Nepheline syenite, Obsidian, Pumice, Andesite, pegmatite, Granodiorite, felsite, norite, dunite, peridotite, dacite, basalt and its varieties,

E) Study of the Optical Properties of Following Rocks :

Granite, Syenite, Diorite, Gabbro, Dunite, Rhyolite, Trachyte, Andesite, Basalt.

B.Sc. II Year
Practical Paper – XI
(Based on Theory Paper No-VIII & IX)

Total Marks: 50

A) Study of Structural Geological Maps Covering Faults, Unconformity, Folds and Dykes.

B) Orthographic and Stereographic Methods of Solving Structural Problems.

C) Study of Following Rocks in Hand Specimen:

Sandstone and its types, Grit, Carbonaceous shale, Fossiliferous limestone, Shelly limestone, Breccia, Marl, mudstone, greywacke, Conglomerate, Arkose, Quartzite, Marble, Mica-Garnet schist, Actinolite schist, Sillimanite Schist, Gneisses, Granulite eclogite, schorl, Amphebolite.

D) Study of the Optical Properties of Following Rocks :

Sandstone, Limestone, Breccia, Conglomerate, Oolitic limestone, Fossiliferous limestone, Quartzite, Shale. Banded Hematite Quartzite, Marble, Mica-Garnet schist, Actinolite schist, Sillimanite Schist, Gneiss, Granulite.

E) Study of structures of Sedimentary and Metamorphic Rocks in hand specimen.

F) Preparation of Geological report based on field tour of four days duration.