

ANDHRA KESARI UNIVERSITY

MINOR

Subject: Geology

w.e.f. AY 2023-24

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Geology and Branches of Geology	3	3
			Geology and Branches of Geology Practical Course	2	1
II	III	2	Crystallography & Mineralogy	3	3
			Crystallography & Mineralogy Practical Course	2	1
	IV	3	Elements of Petrology	3	3
			Elements of Petrology Practical Course	2	1
		4	Structural Geology	3	3
			Structural Geology Practical Course	2	1

SEMESTER-III
COURSE 2: CRYSTALLOGRAPHY & MINERALOGY

Theory

Credits: 3

3 hrs/week

Programme Objectives:

To study crystal systems, 32 crystal classes and their consecutive minerals. To study the Physical and chemical and optical properties of minerals for their identification. It is an optional under Minor Subject.

Programme outcomes:

After completion of the paper, students will be acquainted with the knowledge of identification of Minerals through their physical, chemical and optical properties and the crystal system which they have developed during their origin.

Unit 1

Elements of Crystallography – Derivation of 32 Crystal classes and Herman-Maughn Symbols, twin laws and twin crystals, X-ray crystallography and irregularities in crystals, Etch figures.

15 hours

Unit 2

Structures of silicates, isomorphism and polymorphism. Physical, chemical and optical properties, mode of occurrence of the following mineral groups: Quartz, Feldspars, Feldspathoids and Zeolites.

15 hours

Unit 3

Physical, chemical and optical characters and mode of occurrence of the following mineral groups -- olivine, pyroxene, amphibole, mica, Garnet and Aluminum silicates.

15 hours

Unit 4

Nature of light rays and their propagation, internal reflection, double refraction, interference andmpolarization. Nicol Prism and polaroids. Petrological microscope - parts and their functions.Preparation of thin section of minerals and rocks.

15 hours

Unit 5

Snell's Law – Critical angle – Total Reflection, Pleochroism, Extinction, Determination of retardation with Berek compensator, optic axial angle, Uniaxial and biaxial minerals, Gypsum plate, Quartz wedge and mica plate

15 hours

Reference Books

1. A Text Book of Mineralogy by E.S.Dana
2. Elements of Crystallography by F.A.Wade and R.B.Matrox.
3. Elements of Mineralogy by Rutleys
4. Optical mineralogy by Paul F.F. Kerr
5. Mineral Optics by Philips W.R.
6. Elements of Optical Mineralogy by Winchell A.N.

SEMESTER-IV
COURSE 3: ELEMENTS OF PETROLOGY

Theory

Credits: 3

3 hrs/week

Programme objectives:

The paper is designed to provide a brief knowledge about petrology and its three divisions viz., Igneous Petrology, Sedimentary Petrology and Metamorphic Petrology and description of rocks belonging to each branch. It is an optional under Minor Subject.

Programme outcomes:

Student will get a brief knowledge about

Unit 1

Introduction – Scope of Study of rocks – Composition and Constitution of Magma - Differentiation, Assimilation – Rock Definition - Rock Cycle – Process of formation of Rocks – Brief outline of Bowens Reaction principle. 15 hours

Unit 2

Igneous Rocks – General Characters, Main Igneous rock groups, composition, colour, texture, grain size and crystallinity – Flows – Dykes and Sills – Pipes – Pegmatites – Pyroclastic rocks. 15 hours

Unit 3

Metamorphic Rocks – Definition – Conditions for the formation of Metamorphic rocks – Main Metamorphic rock groups – cleavage, texture, foliation, lineation – Metamorphic folding, grain size – Definition of Metamorphic Facies. 15 hours

Unit 4

Sedimentary Rocks – Definition – Processes of Formation – Classification – Bedding – Particle size – Sorting – Shape of the particles – Matrix and Cement – Sedimentary structures – Sedimentary Facies – Cyclic Sedimentation – Rudaceous Rocks – Arenites, Argillites, Lutites, Turbidites, Calcareous rocks, Organic deposits. 15 hours

Unit 5

Physical Properties of Igneous rocks - Granites, granodiorites, gabbro, phorphories, Dolerites, Rhyolites, Basalts – Metamorphic Rocks - Schist, Gneiss, Amphibolite, Quartzite, Marble, Slate, Phyllite – Sedimentary Rocks - Breccia, Conglomerate, Lime Stone, Sand Stone, Shale, Silt, Shell Lime Stone. 15 hours

Suggested Readings

1. Igneous and Metamorphic Petrology – Turner and Verhoogen
2. Petrology of Igneous and Metamorphic rocks – Hyndman
3. The petrography of Igneous and Metamorphic rocks in India – S.C.Chatterjee.
4. Metamorphic petrology- B. Bhaskara Rao
5. Sedimentary Rocks – Pettijohn, F.J.
6. Origin of Sedimentary Rocks – Blottt, H., Middleton, G. and Murray, R.
7. Introduction to Sedimentology – Sengupta, S.M.
8. An Introduction to Sedimentology – Shelly, R.C.

SEMESTER-IV
COURSE 4: STRUCTURAL GEOLOGY

Theory

Credits: 3

3 hrs/week

Programme objectives:

To inculcate knowledge on principles and mechanics of structural deformation of rocks, types of structural deformations, their advantages, disadvantages. It is an optional under Minor Subject.

Programme outcomes:

Student will get a complete knowledge on principles and mechanics of structural deformations of rocks, types of deformations, their advantages and disadvantages.

Unit 1

Mechanical principles and properties of rocks and their controlling factors – Concept of stress and strain – two dimensional stress and strain analyses – Concept of Dip and Strike - Geometric classification of Folds - Mechanics of folding and buckling and recognition of folds.

15 hours

Unit 2

Joints Classification and their importance in Construction projects. Mechanics of faulting. Classification and recognition of faults. Strike slip faults, normal faults.

15 hours

Unit 3

Unconformities – types of unconformities, criteria for recognition and significance of unconformities. Lamination – problem of lamination indicating extension parallel to fold axis, small scale folds. 15 hours

Unit 4

Structural association, salt domes, diapirs, nappe, tectonic mélanges. Tectonic aspects of Igneous rocks. Geometric classification of plutonic igneous rocks, tectonic setting of plutons.

15 hours

Unit 5

Structures in metamorphic rocks, Foliation, Axial plane foliation, transported foliation, other metamorphic foliations.

15 hours

Suggested Readings

1. Structural and Tectonic principles - Badgley, P.C.
2. Mechanics in Structural geology, Bayly, B.
3. Structural geology – Billings M.P.
4. Structural geology of rocks and region – Davis G.R.
5. Understanding the Earth – Gass I.B., Peter J.Smith and Smith PGL
6. An outline of Structural geology
7. Global tectonics – Keary. P., and Vine F.J.
8. Modres. E., and Twiss., R.J.
9. Folding and fracturing of rocks : Ramsy, J.G.

KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT
Minor Programme from the Year 2023-24 Onwards
Programme- B. A. Honours Geology -Question Paper model,
Second Year-Semester-III & IV

Time: 3 Hours

Total Marks: 75

PART –A

Answer any Five of the following out of Ten Questions

5X5=25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10

PART –B

Answer the following

5x10=50 Marks

- 11a.
- 11b.
- 12a.
- 12b.
- 13a.
- 13b.
- 14a.
- 14b.
- 15a.
- 15b.

Or

Or

Or

Or

Or