



CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department Of GEOLOGY

Semester 2nd (Major Course)

Course Title: Petrology

Course Code: UGGLG22J201

Credits: 4 (Theory: 3, Practical: 1)

Contact Hrs:75 (Theory: 45, Practical: 30)

Max. Marks 100

Theory External: 60; Min Marks: 24

Theory Internal (Continuous Assessment): 15 Marks, Min Marks: 06

Practical Experimental Basis= 15, Min. Marks: 06

Practical Experimental (Continuous assessment) = 10, Min. Marks: 04

Learning Objectives: Providing foundational knowledge about rocks and their origins to delving into advanced topics and applications within the field.

Learning Outcome: To provide insights into the formation processes, geological history, and tectonic activities of the area. The findings contribute to our understanding of Earth's geology and can be used to inform further research on natural resource exploration, environmental assessments, and geological hazard evaluations.

Unit-I

15 Hrs

Igneous petrology

- 1.1. Petrology and its scope.
- 1.2. Definition, origin and types of magma.
- 1.3. Physical properties and chemical composition of the magma.
- 1.4. Crystallization of magma: Bowen's reaction series;
- 1.5. Differentiation of magma: fractionation, gasses transfer within the magma, liquid immiscibility, mixing of magma and assimilation
- 1.6. Textures of igneous rocks: Crystalline/degree of crystallization, Granularity/grain size, Shape of the mineral grains and mutual relationship amongst grains.
- 1.7. Structures of igneous bodies: Pillow structures, ropy structures, blocky structures, flow structures, sheet and platy structures, and columnar structures;
- 1.8. Forms of igneous bodies: concordant and discordant.
- 1.9. Classification of igneous rocks (on the basis of texture, colour, mode of occurrence and mineral composition).
- 1.10. Description of common igneous rocks (granite, rhyolite-diorite, andesite, gabbro basalt, syenite Dunite, peridotite, pumice).

Unit-II

15 Hrs

Sedimentary Petrology

- 2.1. Sedimentary rocks: Definition and significance
- 2.2. Processes involved in the formation of sedimentary rocks: erosion, transportation, deposition, diagenesis and lithification.
- 2.3. Texture: Clastic (Size, Shape, Sphericity, Packing, Fabric and Roundness) and Non-clastic (Crystalline texture and Non-crystalline texture).
- 2.4. Structures of sedimentary rocks: Primary structure (stratification, cross-bedding, graded bedding, ripple marks dunes and mud cracks), secondary structures (concretions, solution structures, oolitic structures, pisolitic structures and biogenic structures (tracks, trails, burrows).
- 2.5. Classification of clastic sedimentary rocks (rudaceous, arenaceous, argillaceous) and non-clastic sedimentary rocks (chemically formed and organically formed rocks).
- 2.6. Description of common sedimentary rocks (sandstone, shale, conglomerate, breccia, limestone, dolomite, laterite).

Unit-III**Metamorphic Petrology**

- 3.1. Metamorphism: definition and agents of metamorphism: heat, pressure and chemically active fluids.
- 3.2. Types of metamorphism: Contact, regional, dynamic, plutonic and retrograde metamorphism
- 3.3. Classification of Metamorphic rocks
- 3.4. Texture of metamorphic rocks: Crystalloblastic, Porphyroblastic and Granoblastic texture.
- 3.5. Structures of metamorphic rocks: slaty, schistose, gneissose. Granulose and augen structures
- 3.6. Description of common metamorphic rocks (slate, phyllite, schist, gneiss, quartzite, marble, migmatite, amphibolite, eclogite).

Unit -IV**PRACTICAL (30 Hrs)****Megascopic properties of rocks:**

- 4.1. Igneous rocks: granite, rhyolite diorite, andesite, gabbro basalt, syenite dunite, peridotite and
- 4.2. Sedimentary rocks: sandstone, shale, conglomerate, breccia, limestone, dolomite and laterite.
- 4.3. Metamorphic rocks: slate, phyllite, schist, gneiss, quartzite, marble, migmatite, and eclogite.
- 4.4. Fieldwork of at least two days/10 Hours.

Recommended Books:

- Best, M. G., 1986: Igneous Petrology, CBS Pub.
- Bose, M. K., 1997: Igneous Petrology, World Press.
- Collinson, J. D, 1999: Sedimentary Structures. Springer Verlag.
- Ehlers and Blatt, 1999: Petrology, (igneous, sedimentary and metamorphic), CBS Pub.
- Miyashiro, A., 1994: Metamorphic Petrology. UCL Press Ltd., London.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Sengupta, S., 1997: Introduction to Sedimentology. Oxford-IBH.
- Turner and Verhoogen, 1999: Igneous and metamorphic petrology, CBS Pub.
- Tyrrell, G.W., 1987: Principles of Petrology. CBS Pub.
- Winter, J. D. 2010. Igneous and Metamorphic petrology.
- Winter, J.D. 2010. Igneous and Metamorphic Petrology.
- Yardley, B. W., 1989: An Introduction to Metamorphic Petrology. Longman, New York.