FOUR YEAR UNDERGRADUATE PROGRAMMES (FYUGP)
IN GEOLOGY UNDER RABINDRANATH TAGORE UNIVERSITY
AS PER NEP-2020

1. Four Year Undergraduate Programmes (FYUGP)
2. Subject: Geology (MINOR-1)
3. Semester: First Semester
4. Course Name: General Geology
5. Paper Code: MIN- GLG-1.1
6. Course level: 100
7. Credit:4 (Th-3, Pract-1)

Programme Specific Outcome: ***Programme Specific Outcome:*** *The Bachelor of Science in Geology (Major) Programme in Four Years Undergraduate Programme (FYUGP) of Lumding College under Rabindranath Tagore University includes a Graded Semester System which combines detailed theoretical knowledge, practical knowledge and extensive Field Survey/ Field work. The Primary goal of this Undergraduate Programme is to provide students' Academic competencies, ethical values and professional skills that facilitate their transition from Undergraduate to Post-graduate work or Professional positions. Students will develop the aptitudes and dispositions necessary to help democratized society by obtaining and maintaining employment as a professional Geologist.*

Course Outcome: *This course provides integrated understanding of the Solar system, Earth as a Planet, its complex processes, past and future evolution and interaction with society. This course also aims at complex interaction among Lithosphere, Biosphere and Atmosphere. Students will get a clear concept about topics related to geomorphological processes and their impact on Earth's surface and landscape development.*

Syllabus showing each unit against class number and marks:

Unit No.	Unit Content	No. Of Classes	Marks
Unit-1 (Theory)	Introduction to various branches of Earth Sciences. General characteristics and origin of the Universe, Solar System and its planets. The terrestrial and Jovian planets. Earth in the solar system - origin, size, shape, mass, density, and its age, Internal Structure of the Earth. Concept of Geological Time Scale	15	25
Unit-2	Elementary knowledge of Lithosphere, biosphere, Hydrosphere and Atmosphere. Oceanic current system and effect of Coriolis force. Endogenetic and exogenetic processes of the Earth-weathering and erosion; Soil: formation, types, soil profile and soil types of India	15	25
Unit-3	Fundamental Concept of plate tectonics and continental drift. Concept of Sea-floor spreading ; Mid Oceanic Ridges, trenches; Earthquake and earthquake belts; Volcanoes- types and their distribution	15	25
Unit-4	**Practical:** Study of contours: Patterns of contours to indicate various topographical features; interpretation of topographic maps; Drawing of profile and study of geomorphological features from topographic maps; Study of soil profile of any specific area. Study of geomorphic features from models.	30	25

SUGGESTED READINGS:

1. Duff, P.M.D., & Duff, D.(Eds). (1993). Holmes' Principles of Physical Geology. Taylor & Francis.
2. Emiliani, C. (1992). Planet Earth: Cosmology, Geology, and the Evolution of Life & Environment. Cambridge University Press
3. Alan P. Trujillo and Harold B. Thurman, Essentials of Oceanography, Prentice Hall
4. Summerfield M.A.(1991), Global Geomorphology-an introduction to the Study of Landforms, Prentice Hall
5. Patwardhan, A.M., The Dynamic Earth System, PHI Learning

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1. Four Year Undergraduate Programmes (FYUGP)
2. Subject: Geology(MINOR-2)
3. Semester: Second Semester
4. Course Name: Crystallography and Mineralogy
5. Course Code: MIN-GLG-2.1
6. Course level: 100
7. Credit:4 (Th-3, Pract-1)

Course Outcome: *This course provides integrated understanding of the crystallization and crystal growth, unit cell, space groups and point groups and study of various crystal systems. Students will learn about crystal intergrowth and twinning, twin law and types of twinning. This course provides a detail optical mineralogy to identify the mineralogical composition of geological materials in order to help reveal their origin and evolution.*

Study and identification of different minerals is a very important part of mineralogy and in the practical classes the students will get sufficient knowledge to identify the minerals.

Syllabus showing each unit against class number and marks

Unit No.	Unit Content	Class hours	Credit/Marks
Unit-1	Crystallography: Crystal and its characteristic features; crystallographic axis, axial ratio, crystal symmetry, Interfacial angle, Parameters, Indices, crystal habits, crystal systems, space-lattice, twinning-twin element, twin laws, types of twin law in different systems, twinning in feldspars.	15	25

Unit-2	Physical Mineralogy: Definition of Minerals; Physical properties of mineral, Relationship of physical properties with atomic structure; Classification of minerals. Study of physical and optical properties, atomic structure and chemistry of the following group of minerals- Olivine, Pyroxene, Amphibole, Mica, Feldspar,	15	25
Unit-3	Nature of light; Reflection and Refraction of rays; R.I.; Dispersion of light; Polarization of light; plane polarization by doubly refracting crystals (Nicol Prism), Pleochroism, Interference Colour, Extinction, types of extinction and extinction angle. Isotropic and Anisotropic (Uniaxial and Biaxial) positive minerals; Optic axis, Optical Indicatrix	15	25
Unit 4	Practical: Study of the forms and symmetry element of the holohedral (Normal) class of Isometric, Tetragonal, Hexagonal, Orthorhombic and Monoclinic. Study of physical properties of minerals in hand specimen: Quartz, Orthoclase, Olivine, Garnet, Sillimanite, Kyanite, Staurolite, Beryl, Tourmaline, Augite, Hornblende, Biotite, Muscovite, Microcline, Plagioclase. Study of minerals in thin sections- Quartz, Orthoclase, Olivine, Garnet, Augite, Hypersthene, Hornblende, Biotite, Muscovite, Microcline, Plagioclase.	30	25

SUGGESTED READINGS:

1. Klein, C., Dutrow, B., Dwight, J., & Klein, C. (2007). The 23rd Edition of the Manual of Mineral Science (after James D. Dana). J. Wiley & Sons.
2. Kerr, P. F. (1959). Optical Mineralogy. McGraw-Hill.
3. Verma, P. K. (2010). Optical Mineralogy (Four Colour). Ane Books Pvt Ltd.
4. Deer, W. A., Howie, R. A., &Zussman, J. (1992). An introduction to the rock-forming minerals (Vol. 696). London: Longman.

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1. Four Year Undergraduate Programmes (FYUGP)
2. Subject: Geology (MINOR-3)
3. Semester: Third Semester
4. Course Name: Structural Geology and Geotectonics
5. Paper Code: MIN-GLG-3.1
6. Course level: 200
7. Credit:4(Th-3, Pract-1)

Course Outcome:*After successful completion of this course student will be able to know accurate geometric description of the structures observed in natural deformed rocks. Moreover this course provides the knowledge of the classifications of folds, faults, fractures etc. This course also provides understanding of tectonic history of the earth. After completion of the course the students will be able to know about the mechanism of deformations and their consequences.*

In the practical classes the students will be able to learn how to use the stereographic projection to plot planar and linear data, determine true and apparent dip, to solve 3-point problems. They will also be able to study megascopically dirrent6 deformed structures. Moreover in the geological field work the students will get through knowledge about the different types of rock exposures and associated structures.

Syllabus showing each unit against class number and marks

Unit No.	Unit Content	Class hours	Credit/Marks
Unit-1	**Structural Geology:** Definition and Scope of Structural Geology; Primary, Secondary, Diastrophic and Non- Diastrophic Structures; Concept of Strike and Dip; **Rock deformation:** Stages and factors of deformation; types of stress; magnitude and units; **Concept of Strain;** Types of strain; relation of stress and strain ellipsoids and their geological significance. **Unconformity:** Types of unconformity and their recognition in the field.	15	25
Unit-2	**Folds:** Morphology, classification of folds; mechanics of folding and their recognition in the field. **Faults:** Basic idea of fault and fault zone; classification of faults; criteria of recognition of faults; mechanics of faulting. **Foliation and Lineation:** Basic idea of foliation and lineation and their types.	15	25
Unit-3	**Geotectonics:** Basic idea of continental drift, sea floor spreading and plate tectonics: plate boundaries, and plate motion, mid oceanic ridges, island arcs, mantle plume and hotspot.	15	25

Unit-4	**Practical:** Stereographic projection of planes and lines; determination true dip and apparent dips; 3-point problems; determination of pitch and plunge of folded structure. Megascopic study of planar, linear and deformed structures. Interpretation of geological maps. Geological field work	30	15 10

SUGGESTED READINGS:

1) Billings, M. P. (1987). Structural Geology, 4th edition. Prentice-Hall.
2) Davis, G.R. (1984). Structural Geology of Rocks and Region. John Wiley
3) Fossen, H. (2010). Structural Geology. Cambridge University Press.
4) Ghosh, S.K. (1993) Fundamentals and Modern Development of Structural Geology. Pergamon Press. v) Marshak, S. and Mitra, G. (1988). Basic Methods in Structural Geology. Prentice Hall.
5) Pollard, D.D. (2005) Fundamental of Structural Geology. Cambridge University Press.
6) Ragan, D.M. (2009). Structural Geology: an introduction to geometrical techniques (4th Ed). Cambridge University Press (For Practical).
7) Ramsay, J.G. (1967). Folding and Fracturing of Rocks. Mc-Graw Hill, New York.
8) Twiss, R.J. and Moores, E.M. (2007) Structural Geology. Second Edition. W. H. Freeman and Company.
9) Stephen M. Tomecek, (2009). Plate Tectonics, Science Foundations.
10) Kent C. Condie(1997).Plate Tectonics and Crustal Evolution, Butterworth Heinemann.