

The new B.Sc (Honours) Course in Geology is for six semesters and the Final Examinations will be conducted by the university at the end of each semester. The total mark for the course is 800 and the semester wise distribution of marks is as follows:

<i>Semester</i>	<i>Paper Code</i>	<i>Theory</i>	<i>Marks</i>	<i>Paper No.</i>	<i>Practical</i>	<i>Marks</i>
First	GELH101	General Geology and Crystallography & Mineralogy.	75	GELH102	Crystallography & Mineralogy	25
Second	GELH201	Petrology	75	GELH202	Petrology	25
Third	GELH301	Structural Geology and Geotectonics	75	GELH302	Structural Geology	25
Fourth	GELH401	Stratigraphy and Palaeontology	75	GELH402	Stratigraphy and Palaeontology	25
Fifth	GELH501	Igneous and Sedimentary & Metamorphic Petrology.	75	GELH502	Igneous and Sedimentary & Metamorphic Petrology	25
	GELH503	Economic Geology	75	GELH504	Economic Geology	25
	GELH601	Remote sensing and Hydrogeology	75	GELH602	Remote sensing and Hydrogeology	25
Sixth	GELH 603	Applied Geology (Exploration, Mining and Engineering Geology)	75	GELH604	Field work and Field Report	25

Semester	THEORY				PRACTICAL				TOTAL (Theory + Practical)
	Paper Code	Internal Assessment	End Semester	Total Marks	Paper Code	Internal Assessment	End Semester	Total Marks	
First	GELH101	19	56	75	GELH102	6	19	25	100
Second	GELH201	19	56	75	GELH202	6	19	25	100
Third	GELH301	19	56	75	GELH302	6	19	25	100
Fourth	GELH401	19	56	75	GELH402	6	19	25	100
Fifth	GELH501	19	56	75	GELH502	6	19	25	100
	GELH503	19	56	75	GELH504	6	19	25	100
Sixth	GELH601	19	56	75	GELH602	6	19	25	100
	GELH 603	19	56	75	GELH604	6	19	25	100

Question Paper pattern: (Theory)

- (a) There will be a total of eight questions in all.
- (b) Two questions are to be set from each unit. Each question will carry 14 marks. Four questions are to be answered, selecting at least one from each unit ($14 \times 4 = 56$).
- (c) Internal Assessment for 19 marks is to be conducted by the respective Colleges.

Duration of Examination: Theory paper: 3 hours
 Practical paper: 4 hours

Max Marks: 75

Time: 3 hours

Unit I: General Geology

Geology: Scope and different branches. Recent thought on the origin of the earth. Composition of the crust. Interior of the earth and evidences from seismic records. Rock cycle, Age of the earth. Geological Time Scale.

Surfacial processes: Weathering, erosion, and mass wasting. Erosion, transportation and deposition by wind, river, glacier and associated landforms produced.

Earthquakes: Basic terms, causes, seismic waves and earthquake zones of India.

Preliminary idea of Volcanoes: Basic elements, types and products.

Basic Concepts of Isostasy (Pratt's and Airy's hypotheses) and Plate tectonics

Unit II: Crystallography

Minerals as crystals. Crystallographic axes, parameters and Miller indices. Crystal forms and symmetry elements. Axial elements and classification of crystals into six systems. Symmetry and forms of normal classes of the six systems. Crystal aggregates, parallel growth and twins, twin plane and composition plane. Space lattice, unit cell. Crystal chemistry: elementary idea of bonding, substitution of elements, preliminary ideas of crystal defects.

Unit III: Mineral optics

Minerals: Definition. Minerals as constituents of rocks. Physical properties of minerals.

Isomorphism and polymorphism, pseudomorphism. Structural framework of silicates and their broad classification.

Polarization of light, Nicol prism, parts of polarizing microscope.

Isotropic and anisotropic minerals, double refraction, birefringence, pleochroism, interference colour, extinction, uniaxial and biaxial minerals.

Unit IV: Descriptive Mineralogy: Physical and optical properties of the following group of minerals: Feldspar, feldspathoid, olivine, amphibole, pyroxene, mica, aluminium silicate, silica.

Reading list:

1. Berry, L.G. and Mason, B.(1979) *Minerology*, CBS
2. Dana, E.S. and Ford, W. (1986)*Textbook of Minerology*, John Wiley .
3. Davis, G.H(1984) *Structure of Rocks and Regions*, John Wiley
4. Deer, W.A., Howie R.A. and Zussman, J. (1976) *An Introduction to Rock Forming Minerals*, John Wiley
5. Ehlers, E.G. (1987) *Optical Minerology*, Blackwell.
6. Flint, R.F. and Skinner, (1974)B.J. *Physical Geology*, John Wiley
7. Ghosh, S.K.(1993) *Structural Geology*, Pergamon Press
8. Holmes. A.(1975) *Principles of Physical Geology*, Nelson and Sons .
9. Klein, C. and Hurlbut, C.S.(1985) *Manual of Minerology*, John Wiley
10. Larson, E. and Birkeland, P.(1982) *Putnam's Geology*, OUP
11. Leet, D. and Judson, S.(1974) *Physical Geology*, Prentice Hall
12. Mason, B. and Moore, C.B. (1985) *Principles of Geo-Chemistry*, Wiley Eastern
13. Mukherjee, P.K. (1992)*A Text Book of Geology*, World Press
14. Park, R.G.(1985) *Foundations of Structural Geology*, Chapman and Hall
15. Phillips, W.R. and Griffin, (1986)D.T. *Optical Minerology*, CBS
16. Pluigm, B. and Marshak, S.(1991) *Earth Structure: An Introduction to Structural Geology and Tectonics*, McGraw Hill
17. Putnam, W.C.(1971) *Geology*, OUP
18. Read, H.H.(1984) *Rutley's Elements of Minerology*, CBS
19. Read, H.H. and Watson, J.(1988) *Introduction to Geology*, ELBS
20. Rogers, A.F. and Kerr, P. (1992) *Optical Minerology*. Blackwell
21. Winchell, A.N.(1979) *Elements of Optical Minerology* John Wiley
22. Dexter Perkins, *Mineralogy*
23. Twiss and Moores, (1989) *Structural Geology*

Paper: GELH102 (Practical): Crystallography and Mineralogy

(Contact hours: 48)

Max. Marks: 25

Time: 4 hours

1. Crystallography

Marks: 2 + 2 = 4

Study of symmetry elements and forms of the crystals belonging to the normal classes of isometric, tetragonal hexagonal, orthorhombic, monoclinic and triclinic systems. (Clinographic sketch and Identification of Forms)

2. Mineralogy

Recognition of the following minerals in hand specimens based on their physical characters:

Marks: $1\frac{1}{2} \times 6 = 9$

Quartz, orthoclase, microcline, plagioclase, augite, hornblende, tremolite, actinolite, olivine, kyanite, sillimanite, muscovite, biotite, staurolite, garnet, apatite, tourmaline, calcite, talc, gypsum, fluorite, topaz and corundum.

Identification of the following minerals under microscope:

Marks: $3\frac{1}{2} \times 2 = 7$

Quartz, nepheline, orthoclase, microcline, kyanite, sillimanite, plagioclase, muscovite, biotite, augite, hypersthene, hornblende, olivine, garnet, tourmaline, and calcite.

3. Laboratory records and viva – voce

Marks: 2+3=5

Reading List:

1. Butler, B. and Bell, J.D. (1988) *Interpretation of Geological Maps*, John Wiley
2. Ehlers, E.G. (1987) *Optical Mineralogy*, Blackwell.
3. Gokahle, N. (1987) *Manual of Geological Maps*, CBS
4. Moorehouse, W.W. (1985) *The Study of Rocks in Thin section*, CBS
5. Read, H.H. (1984) *Rutley's Elements of Mineralogy*, CBS
6. Sen, A.K. (1995) *Laboratory Manual of Geology*, Modern Book Agency, Calcutta