

Year	Semester	Paper	Paper title	Marks		Total marks	Credits	Total marks
				Theory	Internal			
B. Sc. First Year	I	I	USGEOT01: Physical Geology	50	10	60	2	150
		II	USGEOT02: Mineralogy and Elementary mineral optics	50	10	60	2	
		Practical	USGEOP01: Practical	30	-	30	2	
	II	I	USGEOT03: General Geology	50	10	60	2	150
		II	USGEOT04: Crystallography and optical minerology	50	10	60	2	
		Practical	USGEOP02: Practical	30	-	30	2	

Bachelor of Science
B.Sc. (Geology)
Semester –I / II/ III / IV / V / VI

Time: 3 Hours]

[Max. Marks: 50

Note:1) All questions are compulsory and carry equal marks.
2) Draw Neat and Labeled diagram wherever necessary.

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| 1. Long Question from unit I | 10 marks |
| OR | |
| a. Short Question from unit I | 5 marks |
| b. Short Question from unit I | 5 marks |
| 2. Long Question from unit II | 10 marks |
| OR | |
| a) Short Question from unit II | 5 marks |
| b) Short Question from unit II | 5 marks |
| 3. Long Question from unit III | 10 marks |
| OR | |
| a) Short Question from unit III | 5 marks |
| b) Short Question from unit III | 5 marks |
| 4. Long Question from unit IV | 10 marks |
| OR | |
| a) Short Question from unit IV | 5 marks |
| b) Short Question from unit IV | 5 marks |
| Q5 Very short questions (Solve any Ten) | 10 marks |
| a) (From Unit 1) | 1 |
| b) (From Unit 1) | 1 |
| c) (From Unit 1) | 1 |
| d) (From Unit2) | 1 |
| e) (From Unit 2) | 1 |
| f) (From Unit 2) | 1 |
| g) (From Unit3) | 1 |
| h) (From Unit3) | 1 |
| i) (From Unit3) | 1 |
| j) (From Unit4) | 1 |
| k) (From Unit4) | 1 |
| l) (From Unit4) | 1 |

General Instructions

- Theory examination for all Semesters will be at university level
- The examination of Semester I shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- The examination of Semester II shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- Question paper will consist of five questions and each question will be of 10 marks.
- Five questions will be based on four units with internal choice.
- Fifth question will be compulsory with questions from each of four units having equal weightage and there will be no internal choice.
- Practical examination will be of 3 hours duration and separately for each semester having 30 marks each.
- Practical Examination for Odd Semester will be at college level and for Even semester at university level with external examiner.
- The syllabus is based on 6 theory periods and 6 practical periods per week.
- The marks will be given for all examinations and they will be converted into grade points. The final grade card will have marks, credits, grades, grade points, SGPA and CGPA.

Distribution of Practical Marks (Semester I and II each)

1	Practical	21 marks
2	Certified practical record book	03 marks
3	Certified tour report/field diary	03 marks
4	Viva-voce	03 marks

Total 30 marks

B.Sc.-I Year
SEMESTER – I
Geology

F.Y. B.Sc. (Geology)
SEMESTER – I
Paper Code: USGEOT01
Paper –I
PHYSICAL GEOLOGY

Total Lectures-48

Credits-2

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UNIT-I

Geology: Definition, branches, scope and relation to other sciences. Earth as a member of solar system: its size, shape, mass, density, rotational and revolutional parameters, formation of core, mantle, crust, hydrosphere, biosphere and atmosphere.

UNIT-II

Volcanoes: Definition, structure of a typical volcano, active, dormant and extinct volcanoes, types of volcanic eruptions, product of volcano. Distribution and origin of volcanoes.

Earthquakes: Definition, earthquake waves, causes and measurement of earthquake, effects of earthquake, tsunamis and earthquake belts.

UNIT-III

Rock weathering, soil: definition, formation, soil profile and types, geological work done by underground water and oceanic currents.

UNIT-IV:

Geological work done by the wind, river and glaciers.

Books Recommended:

- 1) Arthur Holmes (1978) Principles of Physical Geology
- 2) Emmons, Thiel, Staffer and Allison: Geology principles and Processes.
- 3) Gilluly, Water and Woodward: Principles of Geology
- 4) Robinson, E.S.(1982): Basic Physical Geology
- 5) Judson, Deffeyes and Hargrave, R.: Physical Geology.
- 6) Sanders J.E., Anderson Jr., A.Z., Carola: Physical Geology.
- 7) Cazen, Hatcher and Siemekowski: Physical Geology
- 8) Borges, Gwalani and VeenaRao: Fundamentals of Geology.
- 9) Patwardhan A.M.: The Dynamic Earth System.
- 10) Howell: Introduction to Geophysics.
- 11) Hamblin, Kenneth: The Earths' Dynamic System.
- 12) Sawkins, Chase, Darby and Rapp: The Evolving Earth: A Text Book in Physical Geology. 2
- 13) Mallory and Cargo: Physical Geology.
- 14) Judson Kauffman and Leet: Physical Geology.
- 15) Skinner and Porter: The Dynamic Earth: An introduction to Physical Geology.
- 16) Tarbuck and Lutgens: The Earth: An introduction to Physical Geology.
- 17) Manroe and Wicander: Physical Geology: Exploring the Earth

F.Y. B.Sc. (Geology)
SEMESTER – I
Paper Code: USGEOT02
Paper – II

(Mineralogy and elementary mineral optics)

Total Lectures-48

Credits-2

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UNIT-I:

Definition of mineral, rock forming and ore minerals. Chemical bonding and compound formation. Mineral composition of the earth's crust, chemistry of mineral (polymorphism, isomorphism and pseudomorphism). Various physical properties of minerals: Form, colour, cleavage, luster, fracture, streak, hardness, specific gravity and its determination by Walker's steel yard balance.

UNIT-II:

Properties dependent on magnetism, electricity and radioactivity. Silicate structure. Rock forming minerals-silicates, oxides and sulphides. Chemical and physical properties and geological occurrences of the mineral groups such as quartz, feldspars, feldspathoids, micas and zeolites.

UNIT-III:

Chemical and physical properties and geological occurrences of the mineral groups, such as Pyroxene, Amphiboles, olivine, and aluminous silicates.

UNIT-IV:

Petrological microscope: its parts and functioning.

Elementary mineral optics: Nature of light, ordinary and plane polarized light, Reflection and Refraction, critical angle, refractive index by 1) Becke line method and 2) Abbe refractometer and Nicol prism.

Books Recommended:

- 1) Read: Rutley's Elements of Mineralogy.
- 2) Berry, Mason and Dietrich: Mineralogy
- 3) Dana and Ford: A Text book of Mineralogy
- 4) Deer, Howie and Zussman: An introduction to rock forming minerals.
- 5) Berry, L.G., Mason, B. and Dietrich, R.V., 1982. Mineralogy. CBS Publ.
- 6) Kerr, B.F., 1995. Optical Mineralogy 5th Ed. McGraw Hill, New York.
- 7) Flint, Y., 1975. Essential of crystallography, Mir Publishers.

F. Y. B.Sc. (Geology)
SEMESTER – I
Practical
Paper Code: USGEOPO1

Credits-2

Practical

Study of physical properties in hand specimen of following rock forming minerals-

Quartz and its varieties, Orthoclase, microcline, albite, labradorite, nepheline, leucite, sodalite, natrolite, stilbite, apophyllite, muscovite, biotite, chlorite, hypersthene, augite, diopside, hornblende, tremolite, actinolite, asbestos, olivine, garnet, kyanite, sillimanite, topaz, staurolite, tourmaline, epidote, serpentine, talc, rhodonite, aragonite, calcite, dolomite, magnesite, siderite, rhodocrosite, barites, gypsum, apatite, beryl, fluorite, corundum, kaolinite, zircon, halite.

B.Sc.-I Year
SEMESTER – II
Geology

F.Y. B.Sc. (Geology)
SEMESTER – II
Paper Code: USGEOT03
Paper –I
(General Geology)

Total Lectures-48

Credits-2

UNIT-I:

Concepts regarding origin of the earth, Convection in Earths' core and production of its magnetic field. radiometric methods of determination of the age of the earth: Uranium method, Rb-Sr method, K-Ar method and Carbon 14 method.

UNIT –II:

Application of geophysics in understanding the dynamics of the earth: Internal structure of the Earth on the basis of seismological evidences. Concepts and theories of isostasy. Palaeoclimates: indicators, glacial periods- causes of glacial ages and glacioeustasy.

UNIT –III:

Diastrophism- Epeirogenic and orogenic movements, evidences of elevation and depression of land, eustatic changes. Geosynclines: Origin and types, Mountains: Types and Formation. Evolution of continents and ocean basins.

UNIT –IV:

Continental drift theory: evidences and causes. Evolution of plate tectonic theory: nature and types of plate margins, sea floor spreading, origin and significance of mid-oceanic-ridges and trenches, origin and distribution of island arcs.

Books Recommended:

1. Arthur Holmes (1978) Principles of Physical Geology
2. Emmons, Thiel, Staffer and Allison: Geology principles and Processes.
3. Gilluly, Water and Woodward: Principles of Geology
4. Robinson, E.S.(1982): Basic Physical Geology
5. Judson, Deffeyes and Hargrave, R.: Physical Geology.
6. Sanders J.E., Anderson Jr., A.Z., Carola: Physical Geology.
7. Cazen, Hatcher and Siemekowski : Physical Geology
8. Borges, Gwalani and VeenaRao: Fundamentals of Geology.
9. Patwardhan A.M.: The Dynamic Earth System.
10. Howell : Introduction to Geophysics.
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13. Mallory and Cargo: Physical Geology.
14. Judson Kauffman and Leet: Physical Geology.
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16. Tarbuck and Lutgens: The Earth: An introduction to Physical Geology.
17. Manroe and Wicander: Physical Geology: Exploring the Earth.

F.Y. B.Sc. (Geology)
Paper Code: USGEOT04
Paper-II: (Crystallography and Optical Mineralogy)

Total Lectures-48

Credits-2

UNIT-I:

Crystal, space lattice and unit cell, crystal structure by X-rays considering unit cell of NaCl. Crystallography and Geometric symmetry. Laws of Crystallography: Constancy of Interfacial angle, rationality of indices and symmetry, contact Goniometer and measurement of interfacial angle. Momentary ideas about crystal structure, crystal faces, edges, solid, angles and zones. Crystallographic axes and axial angles. Crystal notations: Miller indices and Weiss parameters.

UNIT-II:

Crystal symmetry and classification of crystals into six systems. Study of crystals of galena class of cubic system, zircon class of tetragonal system and Baryte class of orthorhombic system.

UNIT-III:

Study of crystals of Beryl class of hexagonal system, Gypsum class of Monoclinic system and Axinite class of Triclinic system.

UNIT-IV:

Properties under plane polarized light and crossed Nicol: colour, cleavage, relief, form, pleochroism, twinkling, isotrophism and anisotrophism, extinction and extinction angle, twinning, birefringence, interference colours. Optical characters of the following rock forming minerals in ordinary and plane polarized light: Quartz, microcline, orthoclase, albite, labradorite, muscovite, biotite, chlorite, hornblende, augite, olivine, garnet, calcite, kyanite, sillimanite, tourmaline, epidote, tremolite and actinolite.

Books recommended:

- 1) Read : Rutley's Elements of Mineralogy.
- 2) Berry, Mason and Dietrich: Mineralogy
- 3) Dana and Ford: A Text book of Mineralogy
- 4) Deer, Howie and Zussman: An introduction to rock forming minerals.
- 5) Berry, L.G., Mason, B. and Dietrich, R.V., 1982. Mineralogy. CBS Publ.
- 6) Kerr, B.F., 1995. Optical Mineralogy 5th Ed. McGraw Hill, New York.
- 7) Flint, Y., 1975. Essential of crystallography, Mir Publishers.

F.Y. B.Sc. - I (Geology)
SEMESTER – II
Practical
Paper Code: USGEOP02

Credits-2

Practical

1. Study of elements of symmetry and description of various forms of crystals from normal classes of six crystal systems.
2. Study of the optical characters of minerals listed for theory course using polarizing microscope.

Geological field work:

Student will be required to carry out field work of a short duration in an area of geological interest to study the elementary aspects of field Geology (study of Topographic Features, reading of Topographical maps, use of compass clinometer, making location on Toposheet) and submit a report thereon.