

B.Sc. GEOLOGY- SYLLABUS (CBCS)

2019 - 20 Onwards

THEORY					
Year	Semester		Title of the Paper	HPW	Credits
I.	Sem I	Paper I	Physical Geology and Crystallography	4	4
.	Sem II	Paper II	Mineralogy and Optical Mineralogy	4	4
II	Sem III	Paper III	Igneous and Metamorphic Petrology	4	4
	Sem IV	Paper IV	Sedimentary Petrology and Structural Geology	4	4
III	Sem V	Paper V	Indian Geology and Palaeontology	3	3
		Paper VI	Discipline specific Elective - Optional I A - Hydrogeology or Optional I B - Mineral Exploration	3	3
	Sem VI	Paper VII	Economic Geology	3	3
		Paper VIII	Discipline specific Elective - Optional I A - Environmental Geology or Optional I B - Mining Geology	3	3

PRACTICALS					
Year	Semester		Title of the Paper	HPW	Credits
I.	Sem I	Paper I	Physical Geology and Crystallography	3	1
.	SemII	Paper II	Mineralogy and Optical Mineralogy	3	1
II	SemIII	Paper III	Igneous and Metamorphic Petrology	3	1
	Sem IV	Paper IV	Sedimentary Petrology and Structural Geology	3	1
III	Sem V	Paper V	Indian Geology and Palaeontology	3	1
		Paper VI	Discipline specific Elective - Optional I A - Hydrogeology or Optional I B - Mineral Exploration	3	1
	Sem VI	Paper VII	Economic Geology	3	1
		Paper VIII	Discipline specific Elective -Optional I A - Environmental Geology or Optional I B - Mining Geology	3	1

Note: A Geological field trip including open cast and Underground mine visit is recommended for the BSc. Geology final year students.

B.Sc. GEOLOGY- SYLLABUS (CBCS)

2019 - 2020 Onwards

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I.	Sem I	Paper I	Physical Geology and Crystallography	4	4
.	Sem II	Paper II	Mineralogy and Optical Mineralogy	4	4

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I.	Sem I	Paper I	Physical Geology and Crystallography	3	1
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B.Sc. (CBCS) Geology - I Year
Semester - I : Theory Paper - I
Physical Geology and Crystallography

(4 hrs/week)

Credits-4
(60 hours)

Credit-1- Physical Geology - Earth

Definition of Geology – Basic assumptions of Geology – Its relationship with other sciences – Branches of Geology – Aim and Applications of Geology.

Earth: Its shape, size, and density – movement and their effects. Origin and age of Earth. Interior of the earth. Geological processes – exogenic and endogenic, Definition of weathering – Types of weathering of rocks – physical and chemical; Definition of erosion and denudation, agents of erosion, cycle of erosion; erosion, transportation and deposition;

Earth movements: Definition of diastrophism, epirogeny and orogeny – Mountains. Continental drift and plate tectonics.

Wind: Development of characteristic features by wind (arid cycle) erosion and deposition – pedestal rock-mushroom topography Inselberg – Ventifacts – locus – sand dunes.

Credit-2- Glaciers-Groundwater-Sea

Glaciers: Definition of a glacier – types of glaciers – development of typical land forms by glacial erosion and deposition – Cirque, U-shaped valley, Hanging valley, Monadnocks. Moraines, Drumlin, Eskers and Varves, Characteristic features of glaciated regions.

Groundwater: Storage, of ground water – porosity, permeability aquifer, water table, zone of saturation, artesian well, spring, geysers. Development of typical land form by erosion and deposition by groundwater (Karst topography) sinkhole, cavern, stalactites and stalagmites.

Seas: offshore profile – land forms of sea – marine deposits and coral reefs. Lacustrine (Lake) deposits.

Credit-3-Rivers-Earthquakes-Volcanoes

Rivers: Erosion, Transportation and deposition of river (fluvial) cycle in different stages – Development of typical land forms by river erosion and deposition. V-shaped valley. Waterfall, alluvial fans, Natural levees, Meander, Ox-bow lakes, flood plains, Peneplain and Deltas. Types of rivers.

Earthquakes: Causes and kinds of earthquake waves, and mode of propagation, intensity of earthquakes, Richters scale – seismograph and seismogram. Effects of earthquakes,

Volcanoes: Origin, products of Volcanoes.

Credit-4-Crystallography

Definition of a crystal – amorphous and crystalline states, Morphology of Crystals – face, edge, solid angle, interfacial angle.

Forms: Simple, combination, closed, and open forms.

Symmetry: Plane, axis, centre, crystallographic axes, Parameters, indices; crystallographic notation – parameter system of Weiss, index system of Miller.

Classification of Crystals into 7 Systems.

Morphological study of the following classes of symmetry.

- I. Cubic system – Normal class -Galena type
- II. Tetragonal system – Normal class -Zircon type
- III. Hexagonal system – Normal class - Beryl type
- IV. Trigonal system- Normal class - Calcite type
- V. Orthorhombic system – Normal class - Barytes type
- VI. Monoclinic system – Normal class - Gypsum type
- VII. Triclinic system – Normal class - Axinite type

Practicals:**Credit-5 – Crystallography-Geomorphology****45 hrs (Credits:1)****(3 hrs/week)**

1. Study of Symmetry Elements of Seven Crystal Systems – Orientation and description of crystals from different crystal systems
2. Study of important geomorphological models and charts

Text Books:

1. Holmes Principles of Physical Geology by D.L.Holmes (1978).
2. Physical Geology by A.N.Stracher (1981).
3. An introduction to Crystallography - R.C.Phillips.
4. Essential of Crystallography - E.Flint.
5. A text book of Mineralogy E.S.Dana and W.E.Ford.
6. Elements of Crystallography - F.A..Wade & R.B.Mattox.
7. Elements of Mineralogy - Rutlelys.

References:

1. Basic Physical Geology by E.S.Robinson (1982).
2. The evolving Earth: A text in Physical Geology by E.S.Sawkins et al., (1978).
3. Physical Geology by B.F.Mallory and D.N.Gargo (1979).

FACULTY OF SCIENCE
B.Sc. (CBCS) - I Year Examination
GEOLOGY
Semester-I : Paper I
(Physical Geology and Crystallography)

Time: 3 Hours

Credits : 4
Max.Marks:80

Section-A (Marks: 4 x 8 = 32)

Write short notes on any eight of the following:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

Note: Three short answer type questions from each credit.

Section-B (Marks: 12 x 4 =48)
(Essay questions)

13. a)
or
b)
- 14.a)
or
b)
- 15.a)
or
b)
- 16.a)
or
b)

Note: Two essay questions from each credit with internal choice.

FACULTY OF SCIENCE
B.Sc. (CBCS) - I Year Practical Examination
GEOLOGY
Semester-I : Paper I
(Physical Geology and Crystallography)

Time: 2½ Hours

Credits : 1
Max.Marks:25

Practical Model Paper

- 1) Identify the given crystal models 1-6 and write their crystal system, symmetry elements, forms and Miller Indices. (6x2 = 12 M)
- 2) Identify and add a note on the given geomorphological feature from model/chart 7-8 (2X4 = 8 M)
- 3) Record & Viva (5 M)

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B.Sc. (CBCS) Geology - I Year
Semester - II : Theory Paper - II
Mineralogy and Optical Mineralogy

(4 hrs/week)

Credits-4
(60 hours)

Credit-1-Mineralogy

Definition of mineral – classification of minerals into rock forming and ore minerals. Physical properties of minerals – colour, streak, play of colours, opalescence, asterism, transparency, lustre, luminescence, specific gravity, magnetic properties, Electrical properties, pyro and piezo electricity.

Chemical properties of minerals – Isomorphism, solid solution, polymorphism, allotropy, pseudomorphism, radioactivity; silicate structures.

Modes of Formation of Minerals: Occurrence and association of Minerals.

Credit-2-Descriptive Mineralogy

Study of physical properties, chemical properties and mode of occurrence of the following mineral groups.

Nesosilicate	Olivine, Garnet, Aluminum silicates
Sorosilicate	Epidote
Cyclosilicate	Beryl

Credit-3-Descriptive Mineralogy

Study of physical properties, chemical properties and mode of occurrence of the following mineral groups.

Inosilicate	Pyroxene; Amphibole
Phyllosilicate	Mica, Hydrous magnesium silicate
Tectosilicate	Feldspars, Feldspathoids and Silica group

Miscellaneous: Staurolite, Tourmaline, zircon, Calcite, Corundum, Apatite.

Credit-4-Optical Mineralogy

Petrological microscope (polarizing) its mechanical and optical parts.

Double Refraction, Refractive Index, Construction of Nicol Prism.

Behavior of isotropic and anisotropic minerals between crossed nicols – extinction, pleochroism, interference colours. Definition of Uniaxial and Biaxial minerals.

Credit-5- Practicals – Mineralogy- Optical Mineralogy:
(Credits:1)

45 hrs

(3 hrs/week)

1. Study of physical properties and diagnostic features of the following minerals.

Quartz, Jasper, Agate, Chalcedony, Amethyst, Flint, Chert, Orthoclase, Microcline, Plagioclase, Labradorite, Augite, Hornblende, Tremolite, Asbestos, Muscovite, Biotite, Phlogopite, Olivine, Epidote, Garnet, Kyanite, Sillimanite, Andalusite, Beryl, Zircon, Apatite, Corundum, Talc, Gypsum, Calcite, Serpentine.

2. Study of optical properties of the following minerals: Quartz, Orthoclase, Microcline, Plagioclase, Augite, Hornblende, Hypersthene, Muscovite, Biotite, Garnet, Olivine, Kyanite, Sillimanite, Leucite, Calcite.

Text Books:

1. Rutleys Elements of Mineralogy - H.H.Reed.
2. Manual of mineralogy – C. S.Hurlbut and C.Klein.
3. Mineralogy for students - M.H.Batey.
4. A text book of Mineralogy- E. S. Dana and W. E. Ford

References Books:

1. An introduction to rock forming minerals - Deer, Howie, and zussman.
2. Elements of mineralogy - Mason and Berry.
3. Optical Crytstallography - Wahlstorm.
4. Elements of optical mineralogy; an introduction to microscopic petrography by Winchell, N. H. and A.N.Wichell (Newton Horace), Part-1.
5. Manual of optical mineralogy - Shelley.

FACULTY OF SCIENCE
B.Sc. (CBCS) - I Year Practical Examination
GEOLOGY
Semester-II : Paper II
(Mineralogy and Optical Mineralogy)

Time: 2½ Hours

Credits : 1
Max.Marks:25

Practical Model Paper

- 1) Identify the given rock forming minerals 1-7 and write their physical properties chemical composition and crystal system. (7x2=14)
- 2) Write the optical properties of minerals in thin sections 6-10 under the polarizing microscope and indentify them. (5x2=10)
- 3) Record & Viva (6 M)

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