B.Sc. GEOLOGY
SYLLABUS
(Common core syllabus under CBCS)

With effect from the academic year: 2025-2026 and onwards

Accredited with 'A^{+}' by NAAC

DEPARTMENT OF GEOLOGY
KAKATIYA UNIVERSITY
WARANGAL-506009,
TELANGANA

TELANGANA COUNCIL OF HIGHER EDUCATION

B.Sc. GEOLOGY MODIFICATION OF SYLLABUS (CBCS)

(Effective from academic year (2025-2026)

SCHEME OF INSTRUCTION

YEAR	SEM	COURSE/PAPER (THEORY&PRACTICAL)	COURSE TYPE	HRS/ WEEK	No. of CREDITS	MARKS		
						Internal	SEM End	Total
FIRST	I	Physical Geology and Introduction to Mineralogy (Th)	Optional	4	4	20	80	100
		Physical Geology and Introduction to Mineralogy Lab	Practical	3	1	-	25	25
	II	Descriptive Mineralogy, Optical Mineralogy and Crystallography (Th)	Optional	4	4	20	80	100
		Descriptive Mineralogy,Optical Mineralogy and Crystallography Lab	Practical	3	1	-	25	25

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Telangana, India.

B.Sc. Geology- I Year
Semester – I
Paper–I -Physical Geology& Introduction to Mineralogy

(4 hrs/week) **60 hours (Credits-4)**

Unit-I:

Physical Geology – definition of Geology – scope and importance of geology – branches of Geology – its relationship with other sciences - applications of Geology.

Solar system and its planets - Earth: Its shape, size and density – rotation and revolution and their effects - origin and age of the earth - Interior of the earth and its constituents - Geological processes – exogenetic and endogenetic - Weathering – types of weathering of rocks – physical and chemical weathering – Erosion - agents of erosion, cycle of erosion, transportation and deposition.

Definition of lithosphere, hydrosphere, atmosphere,cryosphere, biosphere.

Unit-II:

Rivers-types of 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, canyon, gorges, waterfall, alluvial fans, natural levees, meander, ox-bow lakes, flood plains, peneplain and deltas.

Groundwater – types of water – porosity, permeability, aquifer, vertical distribution of groundwater: zone of aeration, zone of saturation, water table - artesian well, springs, geysers development of typical land forms by erosion and deposition by groundwater (Karst topography) - sinkhole, cavern, stalactites and stalagmites.

Glaciers - Definition of a glacier – types of glaciers – development of typical land forms by glacial erosion and deposition – cirque, U-shaped valley – hanging valley, monad nocks, moraines, drumlins. Eskers and Varves, Roches mountonees - characteristic features of glaciated regions. Seas - offshore profile – land forms of sea – marine deposits and coral reefs - lacustrine (lake) deposits.

Wind - Development of characteristic features by wind (arid cycle) erosion and deposition – pedestal rock-mushroom topography-in selberg – vent facts – sand dunes – barachans and seifs.

Unit-III:

Earthquakes - Causes of earthquakes, types of earthquake waves, focus, epicenter, classification of earth quakes, intensity of earthquakes, Ritchers scale – seismograph and seismogram; effects of earthquakes, earthquake belts.

Volcanoes- Types of volcanoes, products of volcanoes. Mountains - types of mountains. basics of continental drift and plate tectonics.

Unit-IV:

Introduction to Mineralogy- definition of mineral – classification of minerals into rock forming and ore minerals - physical properties of minerals and play of colours, opalescence, asterism, transparency, luminescence, magnetic properties, electrical properties, pyro and piezo electricity.

Chemical properties of minerals - Isomorphism, solid solution, polymorphism, all otrophy, pseudo orphism, radioactivity, silicate structures, modes of Formation of Minerals

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B.Sc. Geology–I year Semester -I
Paper–I-Physical Geology & Introduction to Mineralogy
(Practicals)

(3 hrs/week) **45 hours (credits-1)**

1. Study of important geomorphological models and charts.
2. Study of physical properties and diagnostic features of the following minerals: zircon, beryl, asbestos, apatite, corundum, talc, gypsum, calcite, barites, fluorite, topaz, serpentine.

Textbooks:

1. Introduction to physical Geology byA.K.Dutta
2. Rutley'selements of mineralogy –H.H.Read- 27th edition-revisedbyC.D.Gribble.

Referencebooks:

1. Principles of Physical Geology by D.L.Holmes (1978).
2. Physical Geology byA.N.Strahler (1981).
3. Basic Physical Geology byE.S.Robinsion (1982).
4. Atext book ofMineralogy by E.S.Dana.
5. Elements of mineralogy –Brian Mason and L.G.Berry.

Practical Model Paper

FACULTYOFSCIENCE
B.Sc.(CBCS)-I Year Practical Examination
GEOLOGY
Semester-I:PaperI
(Physical Geology and Introduction to Mineralogy)

Credits:1

Time: 2Hours **Max.Marks:25**

1) Identify and add anoteon the given geomorphological features from model/chart No.1-2 (2X4 =8 M)
2) Identifythegivenrockformingminerals3-8andwritetheirphysicalpropertieschemicalcomposition and crystal system. (6x2=12 M)
3) Record & Viva (5M)

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B.Sc.GeologyI-Year Semester -II

Paper–II –Descriptive Mineralogy, Optical Mineralogy and Crystallography

(4hrs/week) **60hours(Credits-4)**

Unit-I:

Descriptive Mineralogy: Study of physical properties, chemical properties and mode of occurrence of the following groups :Nesosilicates - Olivine, garnet, aluminum silicates, Sorosilicates - Epidote and Cyclosilicates - Beryl

Unit-II:

Descriptive Mineralogy: Study of physical properties, chemical properties and mode of occurrence of the following mineral groups: In silicates: Pyroxene; amphibole, Phyllosilicates: Mica, hydrous magnesium silicate (Talc), Tectosilicates: Feldspars, felds pathoids and silica group, Miscellaneous: Tourmaline, zircon, calcite, corundum, apatite.

Unit-III:

Optical Mineralogy: Light, refraction, reflection, double refraction, total internal reflection, construction of Nichol prism. behavior of isotropic and anisotropic minerals between crossed nicols – extinction, pleochroism. Polarising microscope (petrological) - its mechanical and optical parts.

Unit-IV:

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 elements - plane, axis and centre, crystallographic axes, crystallographic notation – parameter system of weiss, index system of miller; classification of crystals into six systems (normal class).
Morphological study of the following classes of symmetry:

i. Cubic system –Normal Class– Galenatype.
ii. Tetragonalsystem–NormalClass-Zircontype
iii. Orthorhombicsystem-NormalClass–Barytestype
iv. Monoclinic system –Normal Class –Gypsum type
v. Triclinic system–Normal Class-Axinitetype
vi. Hexagonal system –Normal Class–Beryl type
vii. Trigonal division -Normal Class-Calcite type

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B.Sc. Geology I -Year Semester -II
Paper–II–Descriptive Mineralogy, Optical Mineralogy and Crystallography Practicals

(3 hrs/week) **45 hours (credits-1)**

1. Study of physical properties and diagnostic features of the following minerals:
   Quartz, jasper, agate, chalcedony, amethyst, flint, chert, orthoclase, microcline, plagioclase, labradorite,olivine,augite,hornblende,tremolite,actinolite,garnet,muscovite,biotite,kyanite, sillimanite and and alusite, epidote.
2. Study of optical properties of the following minerals:
   Quartz,orthoclase,microcline,plagioclase,hypersthene,augite,hornblendemuscovite,biotite, garnet, olivine, kyanite, sillimanite, leucite, calcite.
3. Studyofsevencrystalsystems(normalclass)–orientation,symmetryelementsandformswith miller indices.

Textbooks:

1. A text book of mineralogy, Rutley's Elements of mineralogy -H.H.Reed
2. A text book of Mineralogy-E.S.DanaandW.E.Ford.

Reference books:

1. An introduction to rock forming Minerals -Deer, Howie, and Zussman.
2. Elements of Mineralogy- MasonandBerry
3. Optical Crystallography- Wahlstorm.
4. Elementsofopticalmineralogy;anintroductiontomicroscopicpetrographybyWinchel,N.H.and-F.A. and A.N. Wichell (NewtonHorace),Part-1
5. Manual of optical mineralogy-Shelly

Practical Model Paper
FACULTYOFSCIENCE
B.Sc.(CBCS)-I Year Practical Examination GEOLOGY
Semester-II: PaperII
(Descriptive Mineralogy ,Optical Mineralogy and Crystallography Practicals)

Credits: 1
Time: 2 Hours **Max.Marks:25**

1) Identifythegivenrockformingminerals1-4andwritetheirphysicalpropertieschemical composition and crystal system. (4x2=8M)
2) Write the optical properties of minerals in thin sections 5-7underthepolarizingmicroscopeand identify them. (3x2=6M)
3) Identify the given crystal models 8-10 and write their crystal system, symmetry elements, forms and Miller Indices (3x2=6M)
4) Record & Viva (5M)

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Model question paper for Optional and GE
FACULTY OF SCIENCE
B.Sc.(CBCS)–I/II/III Year Examination
GEOLOGY
Semester-I/II/III/IV/V/VI
(Paper - title)
(Optional/GE)

Time: 3 Hours **Credits:4**
Max.Marks:80

Section-A (Marks: 12x4=48)
(Essay questions)

1. a)
   or
   b)
2.a)
   or
   b)
3.a)
   or
   b)
4.a)
   or
   b)

Note: Two essay questions from each unit within ternalchoice.

Section-B (Marks: 4x 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 unit.

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Annexure – I (Credits)
Proposed CBCS Structure from 2025-26 for Under Graduate Courses

Courses		Papers	Total Credits	Credits for each paper / Semester						Credits for each paper / Semester						Credits for each paper / Semester					
				BA						B.Com.						B.Sc.					
				I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI
Core Courses DSC	Major-1	6	30	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Major -2	6	30	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Minor-1	4	20	5	5	5	5	-	-	5	5	5	5	-	-	5	5	5	5	-	-
MIL/AEC (First Language)	English	4	20	5	5	5	5	-	-	5	5	5	5	-	-	5	5	5	5	-	-
Second Language (Telugu, Hindi, Urdu, etc.)		4	20	5	5	5	5	-	-	5	5	5	5	-	-	5	5	5	5	-	-
Multi-Disciplinary Course	MDC 1	1	4	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	4	-
Sec 1, 2		2	4					2	2					2	2					2	2
Sec 3, 4		2	4					2	2					2	2					2	2
Value added course (VAC)	VAC 1, 2	2	6	-	-	-	-	3	3	-	-	-	-	3	3	-	-	-	-	3	3
Internships	Internship / Project	1	4	-	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	4
Total Credits in each semester			142	25	25	25	25	21	21	25	25	25	25	21	21	25	25	25	25	21	21
Total Credits in UG				142						142						142					
Credits under Non-CGPA (Community engagement and service)		NSS /NCC /sports / Extra curricular	6	Upto 6 (2 in each year)						Upto 6 (2 in each year)						Upto 6 (2 in each year)					
		IKS	4	Upto 4 (2 in each, after I & II years)						Upto 4 (2 in each, after I & II years)						Upto 4 (2 in each, after I & II years)					