BANKURA UNIVERSITY

(West Bengal Act XIX of 2013- Bankura University Act, 2013)

Main Campus, Bankura Block-II, P.O.: Purandarpur, Dist.: Bankura, Pin- 722155, West Bengal

Office of the Secretary

Faculty Council for Undergraduate Studies

BKU/FCUG/ 95 /2026 Date: 05/05/2026

NOTIFICATION

As directed, the undersigned is pleased to inform all concerned that Bankura University has initiated the process to implement New Curriculum and Credit Framework for Undergraduate Programme, UGC 2022 (as per NEP 2020) for 4-years Undergraduate programme with Geology as Major, Minor etc. from the academic session 2023-2024. The Syllabus for the purpose will be framed and finalized as per the guidelines of appropriate authority. As an important corollary to the process, the workshop through online mode will be organized on the date mentioned herewith to get the feedback from the stakeholders. Present Students, Alumni, Guardians, Academicians and other stakeholders related to the specific programme/course are requested for their kind participation in the workshop and to present their views/ observations etc. The stakeholders may go through the draft syllabus attached herewith and convey their observations to the office of the undersigned on ugsecretaryoffice@bankurauniv.ac.in within seven days from the date of publication of notice.

Date of Workshop: 10/05/2026 (Sunday);

Time: 06.30 P.M.

Google Meet Link: https://meet.google.com/vbc-pnsv-dhb

Sd/-
Secretary
Faculty Council for Undergraduate Studies

BKU/FCUG/ 95 /2026 Date: 05/05/2026

Copy forwarded for information and necessary action to:
1. Registrar (Addl. Charge), Bankura University.
2. Dean (Officiating), Faculty Council of P.G. Studies in Arts, Science etc.
3. Chairman/Convenor, Undergraduate Board of Studies in Geology.
4. System Administrator, Bankura University with request to upload this in website.
5. Secretary, Hon'ble Vice Chancellor, Bankura University.
6. Guard File

Sd/-
Secretary
Faculty Council for Undergraduate Studies

CURRICULUM AND CREDIT FRAMEWORK FOR FOUR-YEAR UNDERGRADUATE PROGRAMMES OF GEOLOGY WITH A SINGLE MAJOR

(*w.e.f. A.Y. 2023-2024*)

BANKURA UNIVERSITY

BANKURA, WEST BENGAL, PIN 722155

Content

1. Introduction

One of the major initiatives of University Grants Commission (UGC) for quality improvement in higher education system is the curriculum revision. National Education Policy (NEP) 2020 recognizes the important role of higher education in promoting human as well as societal well-being and in developing India. NEP recommends that the undergraduate (UG) programmes will be of either 3 or 4-year duration with multiple entry and exit options within this period. The recommended programme certifications are: UG certificate after completing 01 (one) year, or a UG diploma after 02 (two) years of study; or a bachelor degree after 03 (three) years and a bachelor degree (with honours/ honours with research) after 04 (four) years.

In accordance with the NEP 2020, the UGC has formulated a new student-centric Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) incorporating a flexible choice-based credit system, multidisciplinary approach, and multiple entry and exit options. This will facilitate students to pursue their career path by choosing the subject/field of their own interest.

Geology as a discipline falls within the special category of science with a multidisciplinary approach. The present syllabus for geology at undergraduate level under the CBCS has been framed in compliance with curriculum and credit framework given by the UGC following NEP. The goal of the syllabus is to equip students with the fundamental knowledge of the diverse fields of earth science. The geology programmes integrate field trips with classroom learning to give the hands-on experience, which is often required to succeed. These opportunities develop the technical skills using measuring instruments and laboratory equipment. Thus, more emphasis has been given on skill enhancement courses.

The ultimate goal of the syllabus is to equip students with knowledge, skills, values, attitudes, leadership readiness/qualities and learning. Hence, at the end, the students will be able to secure very good opportunities as per their own choices.

Abbreviations used:

AEC- Ability Enhancement Courses (e.g., English language, MIL etc.); DSC - Department Specific Core Course; DSE – Department Specific Electives; ESE – End Semester Examination; IA – Internal Assessment; L – Lecture, P/Pr.- Practical; SEC – Skill Enhancement Course; T – Tutorial Th. – Theoretical; VAC – Value-Added Course (e.g., Environmental study, Understanding India, Health and Wellness etc.).

2. Semester-wise credit distribution in different UG programmes of Geology with a single major (as on 28.02.2024)

Year	Semester	Category of Courses (Credit of each course** x No. of courses)									Semester-wise total credits (No. of courses)
		Major		Minor Discipline	Multi-disciplinary	SEC	AEC	VAC	Internship/ Apprenticeship	Research Project/ Dissertation	
		DSC	DSE								
1st	**I**	(4x1) = 4	-	(4x1) = 4	(3x1) = 3	(3x1) = 3	(2x1) = 2	(4x1) = 4	(2x1) = 2##	--	**20**(6)
	II	(4x1) = 4	-	(4x1) = 4	(3x1) = 3	(3x1) = 3	(2x1) = 2	(4x1) = 4	(2x1) = 2##	-	**20**(6)
	Total credits (courses**) up to 2nd Semester**	**8**(2)		**8**(2)	**6**(2)	**6**(2)	**4**(2)	**8** (2)	**4** (2)##		**40** (12)
2nd	**III**	(4x2) = 8	-	(4x1) = 4	(3x1) = 3	(3x1) = 3	(2x1) = 2	-	(2x1) = 2##	-	**20**(6)
	IV	(4x4) = 16	-	(4x1) = 4	-		(2x1) = 2	-	(2x1) = 2##	-	**22**(6)
	Total credits (courses**) up to 4th Semester**	**32** (8)		**16** (4)	**9**(3)	**9**(3)	**8**(4)	**8**(2)	**4**##	-	**82** (24)
3rd	**V**	(4x4) = 16		(4x1) = 4	-	-	-	-	(2x1) = 2	-	**22** (6)
	VI	(4x4) = 16		(4x1) = 4	-	-	-	-	-		**20** (5)
	Total credits (courses**)up to 6th Semester**	**64**(16)		**24** (6)	**9**(3)	**9**(3)	**8**(4)	**8**(2)	**2** (1)	-	**124** ((35)
4th	**VII**	(4x4) = 16		(4x1) = 4	-	-	-	-	-	-	**20** (5)
	VIII	(4x4) =16@@		(4x1) = 4	-	-	-	-	-	12$$	**20** (5/3)
	[@@ B. Sc. (Honours)] Total credits (courses**) up to 8th Semester**	**96** (24)		**32** (8)	**9**(3)	**9**(3)	**8**(4)	**8**(2)	**2** (1)	-	**164** (45)
	[$$ B. Sc. (Honours with Research)] Total credits (courses**) up to 8th Semester**	**84** (21)		**32** (8)	**9**(3)	**9**(3)	**8**(4)	**8**(2)	**2** (1)	**12**$$	**164** (43)

****** *Credit of courses*: Major courses (DSC & DSE) – 4; Minor discipline – 4; Multidisciplinary – 3; AEC – 2; SEC – 3; VAC – 4; Internship/Apprenticeship – 2 and Research Project//Dissertation – 12.

Additional requirement (to be acquired in Internship during first year and/or second year), if a student wants to get UG Certificate or UG Diploma programme certifications.

@@ In Semester-VIII, B. Sc. (Honours) students will undertake 03 Major courses for 12 credits (in lieu of a Research project / Dissertation of 12 credits) and another 01 Major course of 04 credits. Thus, B. Sc. (Honours) students will undertake a total of 04 Major courses of a total of 16 credits in Semester VIII.

$$ In Semester-VIII, B. Sc. (Honours with Research) students will undertake a Dissertation of 12 credits (in lieu of 03 Major courses of 12 credits) and another 01 Major course of 04 credits. Thus, B. Sc. (Honours with Research) students will undertake a total of 16 credits in Semester VIII.

3. Semester-wise detailed course curriculum

SEMESTER-VII

COURSE CODE	COURSE TITLE	CREDIT			MARKS				NO. OF HOURS PER WEEK		
		Th	Pr.	Total	IA	ESE		Total	L	T	P
						Th.	Pr				
S/GEL/701/MJC-17	Economic Geology	3	1	4	10	25	15	50	3	0	2
S/GEL/702/MJC-18	Hydrogeology	4	0	4	10	40	0	50	4	0	0
S/GEL/703/MJC-19	Exploration Geology	4	0	4	10	40	0	50	4	0	0
S/GEL/704/MJC-20	Engineering Geology	4	0	4	10	40	0	50	4	0	0
S/GEL/705/MN-7*	Economic Geology	4	0	4	10	40	0	50	4	0	0
	Total in Semester- VII	**19**	**1**	**20**	**50**	**185**	**15**	**250**	**19**	**0**	**2**

***** To be opted by the students having major course of other discipline

4. Major and Minor Courses

4.1 Department Specific Cores (DSC)

4.1.1 ECONOMIC GEOLOGY [SGEL-701MJC-17 & SGEL-705MN-7]

[4 Credits: Th.-3; Pr.-1]

(i) Course objectives:

The objectives of this course are to:

(a) disseminate knowledge of the variety of ore-forming processes,
(b) understand the genetic controls exerted by physical and chemical processes on ore formation in various geologic settings, and
(c) differentiate between resources and reserves and how to estimate them, and
(d) familiarize with some of the common mineral deposits in India.

(ii) Course learning outcomes:

The study of this course enables to:

(a) develop skills in different areas related to economic mineral deposits,
(b) acquire knowledge about a wide range of ore deposits, the geometry of ore bodies, alteration patterns and assemblage of ore and gangue minerals, and
(c) understand about some of the common mineral deposits with respect to Indian Geology.

(iii) Course Content:

THEORY

[*45 Hours*]

Unit 1: Introduction **[05 Hours]**

Objectives of Economic Geology; Definitions: ore, protore, gangue minerals, assay, tenor, grade, resource, reserve.

Unit 2: Nature and morphology of ore deposits **[10 Hours]**

Hypogene and supergene deposits; Epigenetic and syngenetic deposits; Hydrothermal deposits: hypothermal, epithermal, mesothermal and telethermal deposits; Discordant orebodies: regularly and irregularly shaped; Concordant orebodies: igneous rock-hosted, sedimentary rock-hosted stratiform and stratabound orebodies and metamorphic rock-hosted ore deposits.

Unit 3: Texture and structure of ore and gangue minerals **[05 Hours]**

Open space filling; Replacement; Different types of wall rock alteration; texture of assemblage of ore minerals, alteration of ore minerals

Unit 4: Processes of formation of ore deposits **[15 Hours]**

Internal processes: magmatic concentration - crystallisation and segregation, hydrothermal, metamorphism and contact metamorphism, lateral secretion; Surface processes: residual and

mechanical concentration, sedimentary precipitates, secondary or supergene enrichment, submarine exhalative and volcanogenic.

Unit 5: Metallic and non-metallic mineral deposits of India [10 Hours]

Geologic set up, mode of occurrence, mineralogy and genesis of iron ores in Singhbhum and Karnataka, manganese ores in central India, copper ores in Malanjkhand, lead-zinc in Zawar area; Non-metallic and industrial rocks and minerals in India.

PRACTICAL
[*30 Hours*]

Mesoscopic identification of important metallic and non-metallic minerals: haematite, magnetite, ilmenite, bauxite, sphalerite, pyrite, chalcopyrite, galena; Mesoscopic study of coal; Study of microscopic properties and identification of important metallic and non-metallic minerals: haematite, magnetite, ilmenite, bauxite, sphalerite, pyrite, chalcopyrite, galena; Preparation of maps showing distribution of important ores and other economic minerals in India.

Suggested Readings

- Deb, S. (1980) Industrial minerals and rocks of India. Allied Publishers.Guilbert, J.M. and Park Jr., C.F. (1986) The Geology of Ore deposits. Freeman & Co.
- Evans, A.M. (1993) Ore Geology and Industrial Minerals: An introduction. Wiley India Pvt. Ltd.
- Gokhale, K.V.G.K. and Rao, T.C. (1978) Ore deposits of India their distribution and processing, Tata-McGraw Hill, New Delhi.
- Jensen, M. L. and Bateman, A.M. and (2013) Economic Mineral Deposits. Book Selection Centre, Hyderabad.
- Laurence Robb. (2005) Introduction to ore forming processes. Wiley.
- Mookherjee, A (1999) Ore genesis: a holistic approach. Allied Publishers.
- Sarkar, S.C. and Gupta, A. (2014) Crustal Evolution and Metallogeny in India. Cambridge Publications.

4.1.2 Hydrogeology [SGEL-702MJC-18] [4 Credits: Th.-4; Pr.-0]

(i) Course objectives:

This course focusses on:

(a) some of the basic concepts on hydrology and subsurface distribution of water,
(b) hydrogeological properties rocks and laws and principles governing groundwater flow,
(c) chemical attributes of groundwater, and
(d) exploration and management of groundwater resources.

(ii) Course learning outcomes:

After studying the course, the students will be able to:

(a) develop knowledge on occurrence of groundwater, water bearing properties of formations, aquifer types and aquifer parameters,
(b) develop ideas about construction, design and development of water wells, aquifer parameter estimation and the science of groundwater flow under different conditions, and
(c) use the concepts of exploration and management of groundwater.

(iii) Course Content:

THEORY
[*60 Hours*]

Unit 1: Introduction and basic concepts [05 Hours]

Scope of hydrogeology and its societal relevance; Hydrologic cycle: precipitation, evapo-transpiration, run-off, infiltration; Vertical distribution of subsurface water; Genetic classification of groundwater; Water table and piezometric surface.

Unit 2: Rock properties affecting groundwater flow [10 Hours]

Definitions: porosity, void ratio, permeability, hydraulic conductivity, transmissivity, specific storage, specific yield, specific retention, storativity; Classification of rocks with respect to water bearing characteristics; Aquifer and types of aquifer: unconfined, confined and semi-confined; Anisotropy and heterogeneity of aquifers; Pore pressure and its variation across water table.

Unit 3: Groundwater flow [15 Hours]

Darcy's law and its validity; Reynold's Number; Laminar and turbulent flow of groundwater; Measurement of hydraulic conductivity in laboratory - constant head permeameter and falling (variable) head permeameter; Equations of groundwater flow-steady state and transient state; Flownet; Refraction of flowline; Interpretation of water table and piezometric surface contour maps and determination of groundwater flow direction;

Unit 4: Well hydraulics and Groundwater exploration [10 Hours]

Basic concepts on drawdown and specific capacity; Elementary concepts related to equilibrium and non-equilibrium (steady and unsteady) conditions for groundwater flow to a well; Surface and subsurface techniques of groundwater exploration.

Unit 5: Groundwater chemistry [08 Hours]

Physical, chemical and bacteriological properties of water and water quality; Groundwater sampling and preservation; Water quality standard (BIS, WHO); Introduction to methods of interpreting groundwater quality data using standard graphical plots; Elementary concept on groundwater pollution (natural and anthropogenic): arsenic, fluoride and nitrate; Sea water intrusion in coastal aquifers - Ghyben-Herzberg relation.

Unit 6: Groundwater management [06 Hours]

Recharge and discharge areas; Groundwater level fluctuations; Effects of climate change on groundwater; Basic concepts of water balance studies; Issues related to groundwater resources development and management; Rainwater harvesting and artificial recharge of groundwater; Groundwater provinces in India and West Bengal.

Unit 7: Groundwater Modelling **[06 Hours]**

Concept of modelling; Workflow of groundwater modelling; Components of conceptual models: boundaries, hydrostratigraphy and hydrogeological properties, flow direction, source and sinks, groundwater budget component, ancillary information; Numerical models: FD and FE; Governing equation; Data requirement of groundwater flow model; Computer code; Model geometry; Boundaries.

Suggested Readings

- Anderson, M. P. and Woessner, W. W. (1992) Applied Groundwater Modelling, Steady state simulation, Transient simulation, Academic Press USA & UK.
- Davis, S. N. and De Weist, R. J. M. (1966) Hydrogeology, John Wiley & Sons Inc., N.Y.
- Fetter, C. W. (2007) Applied Hydrogeology, CBS Publishers & Distributors.
- Freeze, R. A. and Cherry, J. A (1979) Groundwater, Prentice-Hall, NJ.
- Karanth K. R. (1987) Groundwater: Assessment, Development and Management, Tata McGraw- Hill Pub. Co. Ltd.
- Raghunath H, M. (2007) Groundwater, 3rd Ed. New Age International Publishers, New Delhi.
- Todd, D. K. (2006) Groundwater hydrology, 2nd Ed., John Wiley & Sons, N.Y.

4.1.3 EXPLORATION GEOLOGY [SGEL-703MJC-19] [4 Credits: Th.-4; Pr.-0]

(i) Course objective:

The course provides knowledge on:
(a) geological, geochemical and geophysical techniques of mineral exploration,
(b) estimation of mineral resources and reserves and the errors,
(c) classification of mineral resources and reserves, and
(d) outline of exploration techniques for specific minerals.

(ii) Course learning Outcome:

Upon successful completion of course, the students will be able to understand:
(a) different methods of mineral exploration and sampling techniques,
(b) estimate and classify mineral resources and reserves, and
(c) techniques of exploration for some of the metallic and nonmetallic minerals.

THEORY
[*60 Hours*]

(iii) Content of the course:

Unit 1: Introduction [05 Hours]

Prospecting and Exploration; Principal steps in extraction of mineral deposits; Exploration strategies: area selection, study of political, sovereign and associated risks, target generation on regional scale, resource evaluation, reserve identification; Greenfield and Brownfield exploration.

Unit 2: Mineral resources and reserves [05 Hours]

Definition and types of mineral resources and mineral reserves; Mineral resources in industries: historical perspective and present scenario; History of India's mineral sectors.

Unit 3: Sampling [10 Hours]

Sampling procedures: pitting, trenching; Sample preparation; Chemical analyses and representation of analytical data; Statistical analyses of sampling data: mean, median, mode, standard deviation and variance.

Unit 4: Techniques of exploration [20 Hours]

Geological exploration; Advantages and limitations of use of remote sensing in mineral exploration; Geochemical exploration: geochemical environments and geochemical cycle, geochemical dispersion, pathfinder elements, primary and secondary dispersion patterns; conventional methods of geochemical exploration – lithogeochemical, pedogeochemical, hydrogeochemical, biogeochemical, geobotanical, atmogeochemical, photogeochemical, homogeochemical, preparation of geochemical maps and identification of anomalies; Geophysical exploration: surface geophysical methods – seismic methods, gravity methods, magnetic methods, electrical methods, radioactive methods, subsurface geophysical methods – electrical logging, radioactive logging, temperature logging, sonic logging, caliper logging.

Unit 5: Drilling and Logging [05 Hours]

Core and non-core drilling; Planning of bore holes and location of boreholes on ground; Recovery of samples; Core recovery; Core logging and sampling.

Unit 6: Reserve estimations and Errors [05 Hours]

Principles of reserve estimation; Factors affecting reliability of reserve estimation; Reserve estimation based on geometrical models (square, rectangular, triangular and polygon blocks); Regular and irregular grid patterns; Statistics and error estimation.

Unit 7: Mineral Resources and ore reserve classification [05 Hours]

Conventional classification: developed, proved, probable and possible; USGS / USBM resource classification, United nations framework classification (UNFC).

Unit 8: Outline of exploration techniques for specific minerals [05 Hours]

Ferrous metals, limestone, coal, coal bed methane (CBM) and petroleum.

Suggested Readings

- Haldar, S. K. (2013) Mineral Exploration: Principles and Applications. Elsevier.
- Marjoribanks, R. (2010) Geological Methods in Mineral Exploration and Mining, Second Edition, Springer-Verlag.
- Moon, C. J., Whateley, M. K. G., Evans, A. M. (2006) Introduction to Mineral Exploration, Blackwell Publishing.

4.1.4 ENGINEERING GEOLOGY [SGEL-704MJC-20] [4 Credits: Th.-4; Pr.-0]

(i) Course objectives:

The course provides an overview on:

(a) the work of an engineering geologist related to civil construction,
(b) knowledge on different types of foundation treatment,
(c) properties on construction and building materials, and
(d) application of geological knowledge in construction of dam, reservoir and tunnel, and measures of landslide and earthquake.

(ii) Course learning outcomes:

After completion of course, the students will be able to understand:

(a) role of engineering geologist in civil constructions,
(b) different types of foundation treatments,
(c) engineering properties of construction and building materials,
(d) site selection of dam, reservoir and tunnel, and.
(e) causes, effects and measures of landslide and earthquake.

(iii) Content of the course:

THEORY
[*60 Hours*]

Unit 1: Introduction (Hours 05)

Role of engineering geologists in planning, design and construction of major man-made structural features; Role of engineering geology in civil constructions and mining; Underground structures; Geological factors influence engineering structures; Site investigation and characterization; Rock strength and failure criteria; Mechanical properties of rocks; Different types of laboratory tests to determine rock mechanical properties; Uniaxial and triaxial strength; Drill-hole logging.

Unit 2: Properties of construction and building materials (Hours 10)

Significance of construction material; Properties of building materials: physical properties; Compositions and structures of materials; Significance of building or dimension stone: roofing and facing materials; Rock aggregates.

Unit 3: Rock Quality Designation (RQD) (Hours 05)

Concept, mechanism and significance of: Rock Structure Rating (RSR), Rock Mass Rating (RMR), Tunnelling Quality Index (Q); Classification based on RQD; Geological strength index (GSI).

Unit 4: Dams and Reservoirs (Hours 10)

Definitions and purposes of dams and reservoirs; Geological conditions for the selection of dam and reservoir sites; Terminologies associated with dams; Types of dams – masonry, gravity, buttress, arch and earth dams; Indian examples; Components of a modern dam structure; Types of spillway; Importance of geology in dam structure; Guidelines for major dams and reservoirs; Environmental impacts of major dams; Causes of dam failures and their remedial measures; Case studies of dam construction and failures.

Unit 5: Tunnel (Hours 10)

Different parts of tunnel; Types of tunnel; Geological investigations for site selection for tunnel; Problems related to tunnelling; Factors effecting excavation of rocks while tunnelling; Geological factors influence on tunnelling.

Unit 6: Landslides and mass wasting (Hours 10)

Slope stability; Factor of safety; Factors affecting Slope Stability; Types of failure; Different parts of landslide body; Causes and preventive measures landslides.

Unit 7: Foundation treatments (Hours 05)

Grouting; Rock bolting; Waterproofing; Reinforcement and other support mechanisms; Types of failure.

Unit 8: Earthquakes (Hours 05)

Causes and effects of earthquake; Mitigating of damage caused by Earthquake, Earthquake resistant design and construction; National building code.

Suggested Readings

- Bell F. G. (2006) Basic Environmental and Engineering Geology, Whittles Publishing Co.
- Bell, F.G. (2007) Engineering Geology, Butterworth-Heineman
- Goodman, R.E. (1993) Engineering Geology: Rock in engineering constructions. John Wiley & Sons, N.Y.

- Johnson, R.B. and De Graf, J.V. (1988) Principles of Engineering Geology, John Wiley.
- Krynin, D.P. and Judd W.R. (1957) Principles of Engineering Geology and Geotechnique, McGraw Hill (CBS Publ.).
- Waltham, T. (2009) Foundations of Engineering Geology, Taylor & Francis.

5. Programme Outcome

A. **Graduate Attributes**: The quality and feature or characteristics of an individual, including the knowledge, skills, attitudes, and values that are expected to be acquired by a graduate through studies at the higher education institution.

Some of the characteristic attributes that a graduate should demonstrate:
i) Disciplinary knowledge
ii) Communication Skills
iii) Critical thinking
iv) Problem solving ability
v) Analytical reasoning
vi) Research-related skills vii) Cooperation/Teamwork viii) Scientific reasoning
ix) Reflective thinking
x) Information/digital literacy xi) Self-directed learning
xii) Multicultural competence
xiii) Moral and ethical awareness/reasoning
xiv) Leadership readiness/qualities
xv) Lifelong learning, and
xvi) Development of pleasing personality and readiness to share responsibilities.

B. **Qualification descriptors:** The generic outcomes and attributes expected for the award of a particular type of qualification (for e.g. a bachelor's degree or a bachelor's degree with honours).

Qualification descriptors for a bachelor's degree with honours

(a) Demonstrate (i) a systematic, extensive and coherent knowledge and understanding of an academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including a critical understanding of the established theories, principles and concepts, and of a number of advanced and emerging issues in the field of study; (ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of study, including research and development, teaching and government and public service; (iii) skills in areas related to one's specialization and current developments in the academic field of study, including a critical understanding of the latest developments in the area of specialization, and an ability to use established techniques of analysis and enquiry within the area of specialization.

(b) Demonstrate comprehensive knowledge about materials, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas

pertaining to the chosen disciplinary areas (s) and field of study, and techniques and skills required for identifying problems and issues relating to the disciplinary area and field of study.

(c) Demonstrate skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, analysis and interpretation of data using methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments.

(d) Use knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to the chosen field of study.

(e) Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s) of study.

(f) Address one's own learning needs relating to current and emerging areas of study, making use of research, development, and professional materials as appropriate, including those related to new frontiers of knowledge.

(g) Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyze problems and issues and seek solutions to real-life problems.

(h) Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.

6. **Programme Specific Outcome**

The student graduating with the degree B. Sc. (Honours/Honours with Research) in Geology should be able to

a) Acquire

i. a fundamental/systematic or coherent understanding of the academic field of Geology, its different learning areas and applications in basic Geology like Mineralogy, Petrology, Stratigraphy, Structural Geology, Palaeontology, Economic geology, Hydrogeology, etc. and its linkages with related interdisciplinary areas/subjects like Geography, Environmental sciences, Physics, Chemistry, Mathematics, Life sciences, Atmospheric sciences, Remote Sensing, Computer science, Information Technology;

ii. procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Geology, including professionals engaged in research and development, teaching and government/public service and industrial geology.

iii. skills in areas related to one's specialization area within the disciplinary/subject area of Geology and current and emerging developments in the field of Geosciences.

(b) Demonstrate the ability to use skills in Geology and its related areas of technology for formulating and tackling geosciences-related problems and identifying and applying appropriate geological principles and methodologies to solve a wide range of problems associated with geosciences.

(a) Recognize the importance of RS and GIS, mathematical modelling, simulation and computing, and the role of approximation and mathematical approaches to describing the physical world.

(b) Plan and execute Geology-related experiments or investigations, analyse and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and purpose-written packages, and report accurately the findings of the experiment/investigations while relating the conclusions/findings to relevant theories in Geology.

Demonstrate relevant generic skills and global competencies, such as:

(a) problem-solving skills that are required to solve different types of geoscience-related problems with well-defined solutions and tackle open-ended problems that belong to the disciplinary area boundaries;
(b) investigative skills, including skills of independent investigation of geoscience-related issues and problems.
(c) communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences of technical or popular nature;
(d) analytical skills involving paying attention to detail and ability to construct logical arguments using correct technical language related to Geology and ability to translate them with popular language when needed;
(e) ICT skills; and
(f) personal skills such as the ability to work both independently and in teams

Demonstrate professional behaviour such as being: (a) objective, unbiased, and truthful in all aspects of work and avoiding unethical, irrational behaviour such as fabricating, falsifying or misrepresenting data or committing plagiarism; b) the ability to identify the potential ethical issues in work-related situations; c) appreciation of intellectual property, environmental and sustainability issues; and d) promoting safe learning and working environment.