PROGRAMME SPECIFIC OUTCOME AND COURSE OUTCOME

FOR

B. SC. GEOLOGY (HONOURS)

Six Semester Course under
Choice Based Credit System (CBCS)

PRAGJYOTISH COLLEGE

PROGRAMME SPECIFIC

OUTCOME

B. SC. GEOLOGY (HONOURS)

- The Bachelor of Science in Geology programme of Pragjyotish College under Gauhati University includes graded semester system which combines detailed theoretical knowledge, practical knowledge and extensive field survey/field work. The primary goal of this undergraduate programme is to provide students' academic competencies, ethical values and professional skills that facilitate their transition from undergraduate to post graduate work or professional positions.
- This programme inspires geology graduates to be life-long learners in a diverse global community and prepare them to pursue a geology career through innovative and hands-on engagement in the classroom, laboratory, and field. .
- Students will acquire a solid base of knowledge in the science of geology as a whole as well as earth materials, earth history, mineralogy, petrology and stratigraphy, deformational processes and structural features, and geomorphic processes and landforms.
- Students will understand how geologic resources form, how they can be exploit and use and about their economic value and resource areas.
- Students will develop proficiency in conveying complex geologic concepts in clear, technically correct writing;apply theoretical, conceptual, and observational knowledge to the analysis and solution of geologic data and problems.
- Students will develop proficiency in complex geologic concepts and communicate clearly and articulately their geologic knowledge, findings and interpretations in oral presentation.
- Students will develop the aptitudes and dispositions necessary to help democratize society by obtaining and maintaining employment as a professional geologist.
- Students will be able to Interpret, analyze, discuss, and critique topics about geological problems.
- They will be able to produce high quality written analyses of data, results, interpretations, and conclusions in a scientific format.
- As geology is mainly a field work based subject so students are to be trained to carry out extensive field work and to do advanced geological and scientific analysis, there by imparting practical knowledge/ hands- on training in the geological field work for augmenting practical/ professional knowledge which has implication in near future. Students will greatly strengthen their observational accuracy in the field, and this skill will translate into other aspects of data description and interpretation and they will gain new field experience, perspective, competence, and confidence as a field geologist.
- Students will develop the capability to produce geologic maps and cross sections of unknown terrains working individually and/or in groups.Production of geologic maps will allow students to demonstrate the capacity for synthesizing and interpreting field data and compiling that information into a working understanding of the assigned field area.

Course outcome

Paper Code: GLG-HC-1016
Paper Name: EARTH SYSTEM SCIENCE

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Earth and its relation to Universe, major internal processes of the Earth and tectonic processes. 2. Processes operating in our climate and mechanism of formation and movement of the ocean currents which affects the climate system in the Earth. 3. Geological time scale and evolution of through the geologic time 4. Distribution of elements, Chemical differentiation and composition of the Earth 5. Soil formation processes	Unit 1: Earth as a planet	Remember, Understand
	Unit 2: Earth's magnetic field	Remember, Understand
	Unit 3: Plate Tectonics	Remember, Understand, Analysis
	Unit 4: Hydrosphere and Atmosphere	Remember, Understand, Analysis
	Unit 5: Soil	Remember, Understand
	Unit 6: Understanding the past from stratigraphic records	Remember, Understand
	Unit 7: Cosmic abundance of elements	Remember, Understand, Analysis

Paper Code: GLG-HC-1026
Paper Name: MINERAL SCIENCE

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on—	Unit 1: Crystallography	Remember, Understand, Analysis

1. Elementary ideas about crystal morphology in relation to internal structures 2. Elements of crystal chemistry and aspects of crystal structures 3. Basics of Physical mineralogy and Optical Mineralogy. 4. Identification of different minerals based on physical and optical properties	Unit 2: Crystal symmetry and projections	Remember, Understand, Analysis
	Unit 3: Rock forming minerals	Remember, Understand, Analysis
	Unit 4: Properties of light and optical microscopy	Remember, Understand, Analysis

Course outcome
Core Courses
Paper Code: GLG-HC-2016
Paper Name: ELEMENTS OF GEOCHEMISTRY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Concepts of geochemistry 2. Composition of different Earth reservoirs and the nuclides and radioactivity 3. concept of radiogenic isotopes in geochronology and isotopic tracers 4. Use appropriate techniques for determining abundance of major, trace and rare earth elements in rocks. 5. Geochemical data analysis and interpretation of common geochemical plots.	Unit- 1: Concepts of geochemistry	Remember, Understand, Analysis
	Unit 2: Layered structure of Earth and geochemistry	Remember, Understand, Analysis
	Unit 3: Element transport	Remember, Understand, Analysis
	Unit 4: Geochemistry of solid Earth	Remember, Understand, Analysis
	Unit 5: Geochemical behavior of selected elements	Remember, Understand, Analysis

Paper Code: GLG-HC-2026
Paper Name: STRUCTURAL GEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the	Unit- 1: Structure	Remember, Understand,

students will have knowledge and skills on— 1. Accurate geometric description of the structures observed in natural deformed rocks. 2. Accurate geometric description of the structures observed in natural deformed rocks. 3. Classification and basic idea about different structural elements, for e.g. fold, fault, joint, foliation, lineation.. 4. To read geologic maps and solve geological map. 5. To use the stereographic projection to plot planar and linear data.	and Topography	Analysis
	Unit 2: Stress and strain in rocks	Remember, Understand, Analysis
	Unit 3: Folds	Remember, Understand, Analysis
	Unit 4: Foliation and lineation	Remember, Understand, Analysis
	Unit 5: Fractures and faults	Remember, Understand, Analysis

Paper Code: GLG-HC-3056
Paper Name: IGNEOUS PETROLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Origin and nature of magma, Mode of occurrence, texture and structure of igneous rocks and classification of igneous rocks based on mineralogical and chemical criteria. 2. Understand Binary and Ternary Phase diagrams, Magma generation in crust and mantle, their emplacement and evolution 3. Magmatism in different tectonic settings and Petrogenesis of Igneous rocks 4. Identification of igneous rocks, texture and structure in hand specimen and to interprete the environment and process of formation.	Unit- 1: Concepts of Igneous petrology	Remember, Understand, Analysis
	Unit- 2: Forms	Remember, Understand, Analysis
	Unit- 3: Phase diagrams and petrogenesis	Remember, Understand, Analysis
	Unit- 4: Magmatism in different tectonic settings	Remember, Understand, Analysis
	Unit- 5: Petrogenesis of Igneous rocks	Remember, Understand, Analysis

Paper Code: GLG-HC-3066
Paper Name: SEDIMENTARY PETROLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Process of formation of sedimentary rock, diagenesis. 1. Knowledge on sediment transport, erosion and deposition 2. Detailed knowledge on sedimentary atructure 3. Paleocurrent analysis 4. Composition of different sedimentary rocks.	Unit- 1: Origin of sediments	Remember, Understand,
	Unit 2: Sediment granulometry	Remember, Understand, Analysis
	Unit 3: Sedimentary textures, structures and environment	Remember, Understand, Analysis
	Unit 4: Varieties of sedimentary rocks	Remember, Understand, Analysis
	Unit 5: Diagenesis	Remember, Understand, Analysis

Paper Code: GLG-HC-3076
Paper Name: PALEONTOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Basic idea about palaeontology which includes mode of preservation of fossil and importance of fossil in in various aspects of geological studies. 2. Morphological characteristics and geological distribution and functional adaptation of various classes 3. Evolutionary trend of Man, Proboscidea from the study of vertebrate fossils. 4. Importance of fossil	Unit-1: Fossilization and fossil record	Remember, Understand,
	Unit- 2: Taxonomy and Species concept	Remember, Understand,
	Unit- 3: Invertebrates	Remember, Understand, Analysis
	Unit- 4: Vertebrates	Remember, Understand,
	Unit- 5: Application of fossils in Stratigraphy	Remember, Understand, Analysis

Paper Code: GLG-HC-4016
Paper Name: METAMORPHIC PETROLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Metamorphic petrology, types of metamorphism, depth zone of metamorphism. 2. Facies and facies series of metamorphism, textures and structures structures of metamorphic rock. 3. Characteristic mineral assemblage and mineral reactions of mafic, basic and calcareous rock. 4. Megascopic and microscopic study (textural and mineralogical) of varoious metamorphic rocks	Unit- 1: Metamorphism: controls and types.	Remember, Understand,
	Unit- 2: Metamorphic facies and grades	Remember, Understand,
	Unit- 3: Metamorphism and Tectonism	Remember, Understand, Analysis
	Unit- 4: Migmatites and their origin	Remember, Understand, Analysis
	Unit- 5: Metamorphic rock associations	Remember, Understand, Analysis

Paper Code: GLG-HC-4026
Paper Name: STRATIGRAPHIC PRINCIPLES AND INDIAN STRATIGRAPHY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Familiarize the student with stratigraphic principles and nomenclature, major stratigraphic units, methods of stratigraphic correlation. 2. Understand basic principles of stratigraphy, different types of stratigraphic units. 3. Preliminary concepts of sequence stratigraphy, magneto stratigraphy and seismic stratigraphy. 1. Detailed stratigraphy of Precambrian in	Unit- 1: Principles of stratigraphy	Remember, Understand,
	Unit- 2: Code of stratigraphic nomenclature	Remember, Understand,
	Unit 3: Physiographic and tectonic subdivisions of India	Remember, Understand,
	Unit 4: Phanerozoic Stratigraphy of India	Remember, Understand,

peninsular India, Phanerozoic Stratigraphy of India, Volcanic provinces of India and Stratigraphic boundaries.	Unit 5: Volcanic provinces of India	Remember, Understand,
	Unit 6: Stratigraphic boundaries	Remember, Understand

Paper Code: GLG-HC-4036
Paper Name: HYDROGEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will have knowledge and skills on— 1. Acquire knowledge about the physical and chemical attributes, occurrence, movement and exploration of the groundwater resources. 2. Occurrence of groundwater, water bearing properties of formations, aquifer types and aquifer parameters. 3. Preparation and interpretation of water table maps and analysis of rainfall data. 4. To learn Graphical representation of chemical quality data and water classification (C-S and Trilinear diagrams) Simple numerical problems related to: determination of permeability in field and laboratory, Groundwater flow, Well hydraulics etc	Unit 1: Introduction and basic concepts	Remember, Understand,
	Unit 2: Groundwater flow	Remember, Understand,
	Unit 3: Well hydraulics and Groundwater exploration	Remember, Understand, Analysis
	Unit 4: Groundwater management	Remember, Understand, Analysis
		Remember, Understand, , Analysis
		Remember, Understand, Analysis

Paper Code: GLG-HC-5016
Paper Name: ECONOMIC GEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn-- 1. Concept about the process of formation of economic mineral deposit, mode of formation of ore deposit and classification of economic mineral deposit. 2. Exploitation techniques, Remote Sensing, Geophysical and Geochemical Explorations 3. Megascopic identification of ore minerals: Iron, copper, Manganese, Lead and Zinc, Aluminum, Chromium 4. Study of microscopic properties of ore forming minerals (Oxides and sulphides)and assessment of grade of ore and reserve estimation	Unit 1 Ores and gangues	Remember, Understand,
	Unit 2: Mineral deposits and Classical concepts of Ore formation	Remember, Understand,
	Unit 3: Mineral exploration	Remember, Understand,
	Unit 4: Structure and texture of ore deposits	Remember, Understand,
	Unit 5: Metallic and Nonmetallic ores	Remember, Understand, ,
		Remember, Understand,

Paper Code: GLG-HC-5026
Paper Name: GEOMORPHOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn--	Unit 1	Remember, Understand,

1. Concept about topics related to geomorphology which includes the role of climate and tectonics on landscape development, weathering processes, mass wasting and hill slope evolution 2. Endogenic- Exogenic interactions, Rates of uplift and denudation, Tectonics and drainage development, Sea-level change, Long-term landscape development. 3. Finally to get an overview of Indian Geomorphology, Extraterrestrial landforms. 4. Student will learn reading of topographic maps, Concept of scale Preparation of a topographic profile, Preparation of longitudinal profile of a river, Calculating Stream length gradient index, Morphometry of a drainage basin 5. To learn preparation of geomorphic map and Interpretation of geomorphic processes from the geomorphology of the area	Unit 2	Remember, Understand,
	Unit 3:	Remember, Understand, Analysis
	Unit 4	Remember, Understand,
	Unit 5	Remember, Understand, Analysis

Paper Code: GLG-HE-5016
Paper Name: EXPLORATION GEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn--	Unit 1: Mineral Resources	Remember, Understand,
	Unit 2:	Remember, Understand,

1. To learn Resource reserve definitions, Mineral resources in industries 2. Learning Prospecting and Exploration techniques, , Sampling, sub, trenching and drilling, Geochemical exploration. 3. Learning Drilling and Logging techniques, Planning of bore holes and location of boreholes on ground 4. To study Principles of reserve estimation, density and bulk 5. To identify anomaly, to prepare Geological cross-section and Models of reserve estimation	Prospecting and Exploration, Unit 3: Evaluation of data Unit 4: Drilling and Logging Unit 5: Reserve estimations and Errors	 Remember, Understand, Remember, Understand, Analysis Remember, Understand, , Remember, Understand,

Paper Code: GLG-HC-6016
Paper Name: ENGINEERING GEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn-- 1. To familiarize students about role of geologist in various engineering construction sites. 2. To learn Foundation treatment: Grouting, Rock Bolting and other support mechanisms, 3. To understand Concept, Mechanism and Significance of, Rock Quality Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Tunneling Quality Index (Q)' 4. To understand Causes, Factors and corrective/Preventive measures of Landslides and Earthquakes 5. Learning Computation of reservoir area, catchment area, reservoir capacity	Unit 1 Unit 2 Unit 3 Unit 4 Unit 5	Remember, Understand, Remember, Understand, Analysis Remember, Understand, Analysis Remember, Understand, Analysis Remember, Understand, ,

and reservoir life, Index properties of rocks, Computation of RQD, RSR, RMR and 'Q'.		

Paper Code: GLG-HC-6026
Paper Name: REMOTE SENSING AND GIS

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn-- **1.** The students will get an idea about basics of remote sensing, **2.** They will learn about the application of remote sensing in geomorphological, structural and lithological mapping and natural hazard mitigation and basics of GIS and data analysis. **3.** Concepts of GPS, Integrating GPS data with GIS and Applications in earth system sciences **4.** Understanding Digital Image Processing, Image Errors. **5.** GIS integration and Case studies-Indian Examples. **6.** Aerial Photo interpretation, identification of sedimentary, igneous	Unit 1: Photogeology	Remember, Understand,
	Unit 2: Remote Sensing	Remember, Understand, Analysis
	Unit 3: Digital Image Processing	Remember, Understand, Analysis
	Unit 4: GIS	Remember, Understand, Analysis
	Unit 5: GPS	Remember, Understand, ,

and metamorphic rocks and various Aeolian, Glacial, Fluvial and Marine landforms **7.** Introduction to DIP and GIS softwares. Digital Image Processing exercises including analysis of satellite data in different bands and interpretation of various objects on the basis of their spectral signatures.		

Paper Code: GLG-HC-6036
Paper Name: FUEL GEOLOGY

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn-- 1. Mechanism of hydrocarbon generation from organic material 2. To study oil fields of NE India. 3. To comprehend fundamentals of coal, definition and coal forming sedimentary environments, definition and 4. Analytical techniques in coal and its importance in coal classification and utilization for various industries, 5. Concept of macerals, its gross diagnostic properties under microscope and implications in climate and paleogeography. 6. Getting an idea about Coal Bed Methane (CBM): global and Indian scenario,Underground coal gasification and Coal liquefaction.	Unit 1: Coal	Remember, Understand,
	Unit 2: Coal as a fuel	Remember, Understand, Analysis
	Unit 3: Petroleum	Remember, Understand, Analysis
	Unit 4: Petroleum Reservoirs and Traps	Remember, Understand, Analysis
	Unit 5: Other fuels	Remember, Understand, ,

Paper Code: GLG-HC-6046
Paper Name: INTRODUCTION TO GEOPHYSICS

Course Outcome	Unit no. and Name	Bloom's Taxonomy Level
Upon successful completion, students the students will learn-- **1.** Interrelationship between geology and geophysics, Role of geological and geophysical data in explaining geodynamical features of the earth. **2.** To understand Different types of geophysical methods - gravity, magnetic, electrical and seismic; their principles and applications ,Concepts and Usage of corrections in geophysical data **3.** To study Different types of surveys, grid and route surveys, profiling and sounding techniques Scales of survey, Presentation of geophysical data **4.** To learn Application of Geophysical method in Regional geophysics, oil and gas geophysics, ore geophysics, groundwater geophysics, engineering geophysics etc.	Unit 1: Geology and Geophysics	Remember, Understand,
	Unit 2: General and Exploration geophysics	Remember, Understand, Analysis
	Unit 3: Geophysical field operations	Remember, Understand, Analysis
	Unit 4: Application of Geophysical methods	Remember, Understand, Analysis
	Unit 5: Geophysical anomalies	Remember, Understand, ,Analysis