SHAHID MATANGINI HAZRA GOVT. COLLEGE FOR WOMEN

Teaching Assignment and Lesson Plan

Academic Session: 2023-24 (Even Semester)

Department: Geology

Semester: Second

B.Sc. Honours

Core Course (CC)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
APARUPA BANERJEE, LOVELY BURMAN & ENAKSHI DAS	**MJ-2T: Mineral Science**	**UNIT – I: Crystallography**	1.Elementary ideas about crystal morphology in relation to internal structures	**20th JUNE,2024**	3	**65**
			2. Crystal parameters and Miller indices		3	
			3. Crystal symmetry and classification of crystals into point groups, space groups and crystal systems		5	
		Unit 2: Rock forming minerals	1.Minerals - definition and classification, physical and chemical properties		6	
			2. Chemical classification of minerals		3	
			3. Composition of common oxides, carbonated, sulphides and sulphates and phosphates		3	
			4. Composition of common rock-forming minerals		3	
		Unit 3: Atomic arrangement	1. Crystal structure and its controls: bonding and coordination principles, atomic arrangement: unit cell,		5	

		s and Mineralogical structure	CCP and HCP structures.			
			2. Brief idea about Pauling's rules, Solid solution, Pseudomorphism and Polymorphism: elementary concept on principle types – common polymorphic forms of C, SiO2 and Al2SiO5		7	
			Classification of silicate groups based on structure and derivation of structural formulae based on composition.		7	
		Unit 4: Optical mineralogy	Optical behaviour of crystals – Isotropic and anisotropic minerals; Nicol prism and its principle; 2. Refractive index of minerals; Uniaxial & Biaxial minerals; Optical indicatrix of uniaxial and biaxialminerals; Birefringence, Interference colour and use of interference colour chart; Relation between crystallographic and optical axes of crystals 3. Pleochroism and pleochroic scheme; Extinction; Study of interference figures; Optic sign of uniaxial and biaxial minerals		15	
		Unit 5: Instrumentation Techniques in Geology:	SEM, EPMA, XRF, XRD		5	

	MJ2P : Mineral Science (Practical)	1.Study of the symmetry of crystals 2. Study of physical properties of minerals in hand specimen: Olivine, Garnet, SilIimanite, Kyanite, Staurolite, Beryl, Tourmaline, Pyroxene, Actinolite, Tremolite, Hornblende, Serpentine, Talc, Muscovite, Biotite, Quartz, Alkali feldspar, Plagioclase, Nepheline, Pyrite, Chalcopyrite, Galena, Sphalerite, Graphite, Magnetite, Haematite, Fluorite, Calcite, Dolomite,Gypsum, Asbestos, Ilmenite, Chromite, Pyrolusite, Psilomelane, Bauxite 3.Study of optical properties of common rock-forming minerals: quartz, orthoclase, microcline, plagioclase, perthite, nepheline, olivine, orthopyroxene, clinopyroxene, hornblende, staurolite, garnet,muscovite, biotite, calcite, kyenite, tourmaline, tremolite, actinolite, Sillimanite, andalusite, scapolite.		**20th JUNE,2024**	5 10 15	**30**
APARUPA BANERJEE, LOVELY BURMAN & ENAKSHI DAS	**MI-2T: Introduction to Mineralogy**	**Unit 1:**	Crystals and their characters:	**20th JUNE,2024**	2	**21**
		Unit 2:	Crystal form, face, edge, solid angle; Interfacial angle and their measurements; Crystallographic axes and angles.		2	
		Unit 3:	Symmetry elements and description of normal class of Isometric, Tetragonal, Hexagonal, Trigonal, Orthorhombic, Monoclinic and Triclinic systems.		5	
		Unit 4:	Introduction to Mineralogy, Definition and characters of mineral		3	
		Unit 5:	Classification of Minerals		2 2	

		Unit 6:	Common physical properties of minerals; Chemical composition and diagnosticphysical properties of minerals such as: Quartz, Orthoclase, Microcline, Hypersthene, Hornblende, Garnet, Muscovite, Biotite, Chlorite, Olivine, Epidote, Calcite.		5	
	MI-2: Introduction to Mineralogy (Practical)	1. Crystallography: Study of symmetry elements of normal class of Isometric, Tetragonal, Hexagonal, Trigonal, Orthorhombic, Monoclinic and Triclinic systems.. 2. Mineralogy: Study of physical properties of minerals mentioned in theory course.		**20th JUNE,2024**	5 10	15

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4th Semester (Hons & Gen)

Semester: Fourth
B.Sc. Honours
Core Course (CC)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of classes required to complete the assignment
ENAKSHI DAS	**C8T: Metamorphic Petrology**	**Unit I: Metamorphism: controls and types**	1. Definition of metamorphism. Factors controlling metamorphism, Types of metamorphism– contact, regional, fault zone metamorphism, impact metamorphism	**2nd APRIL,2024**	3	**37**
			2. Causes of metamorphism and concept of metamorphic P-T-t paths		3	
		Unit 2: Metamorphic Facies and Grades. Metamorphic Structures and Textures	1. Index minerals, metamorphic zones and isograds. Structure and textures of metamorphicrocks		4	
			2. Concept of metamorphic facies and grade		2	
			3. Mineralogical phase rule of closed and open system		2	
			4. Composition-paragenesis diagrams. ACF, AKF and AFM diagrams		3	
			5. Metamorphic products of pelitic,		7	

			carbonate and mafic igneous rocks			
		Unit 3: Metamorphic reactions. Metamorphism and deformation.	1. Progressive and retrogressive metamorphism		2	
			2. Prograde and retrograde metamorphic minerals reactions.		2	
			3. Relationship between metamorphism and deformation.		2	
		Unit 4: Migmatites and their origin	1. Metasomatism and role of fluids in metamorphism.		1	
			2. Brief idea of crustal anatexis. Migmatites and its origin.		2	
		Unit 5: Metamorphic rock associations and plate tectonic settings	Regional occurrence and tectonic significance of metamorphic rocks: Metamorphism along convergent plate margins, in continent-continent collisions, in rifting terrains and sea floor metamorphism.		4	
	C8P: Metamorphic Paleontology Lab	1. Hand specimen study of following metamorphic rocks: Slate, Phyllite, Schist, Gneiss, Amphibolite, Charnockite, Khondalite, Mafic granulite, Marble			4	
		2. Textural and mineralogical study of following metamorphic rocks in thin sections: slate,varieties of schists, gneiss, amphibolite, charnockite, khondalite, mafic granulite, eclogite,marble, high Mg-Al granulites		**2nd APRIL,2024**	15	**24**
		3. Graphical plots of metamorphic mineral assemblages using chemographic diagrams			5	
APARUPA BANERJEE	**C9T: Principles of Stratigraphy and Precambrian**	**Unit 1: Principles of stratigraphy**	1. Fundamentals of lithostratigraphy, biostratigraphy and chronostratigraphy.	**2nd APRIL,2024**	2	**44**

	Stratigraphy of India		2. Introduction to concepts of dynamic stratigraphy (chemostratigraphy, seismic stratigraphy,sequence stratigraphy).		3	
			3. Relevance of Type section.		2	
			4. Principles of stratigraphic correlation.		2	
		Unit 2: Code of stratigraphic nomenclature	1. International Stratigraphic Code – development of a standardized stratigraphic nomenclature		1	
			2. Concepts of Stratotypes. Global Stratotype Section and Point (GSSP)		1	
			3. Brief introduction to the concepts of lithostratigraphy, biostratigraphy, chronostratigraphy, seismic stratigraphy, chemostratigraphy, magnetostratigraphy, sequence stratigraphy and their subdivisions with Indian examples		8	
		Unit 3: Principles of stratigraphic analysis Facies concept in stratigraphy	1. Walther's Law of Facies.		1	
			2. Concept of paleogeographic reconstruction		2	
APARUPA BANERJEE	**C9T: Principles of Stratigraphy and**	**Unit 4: Stratigraphic boundaries**	1. Archaean-Proterozoic boundary.	**2nd APRIL,2024**	2	
			2. Precambrian-Cambrian boundary		2	

	Precambrian Stratigraphy of India	**in India**	and their status in global perspective.			
		Unit 5: Physiographic and tectonic subdivisions of India	1. Brief introduction to the physiographic and tectonic subdivisions of India		1	
			2. Introduction to Indian Shield, Craton		2	
			3. Introduction to Indian Precambrian belts.		2	
			4. Introduction to Proterozoic basins of India		2	
		Unit 6: Geologic evolution Important Precambrian terrains	1. Geologic evolution with emphasis on sedimetation, lithology, magmatism, structure, metamorphism and geochronology of: Singhbhum, Dharwar, Rajasthan, Central India and Eastern Ghats.		8	
			2. Vindhyan and Cudappah basins of India.		3	
	C9P: Stratigraphic Principles and Indian Stratigraphy Lab	1. Study of geological map of India and identification of major stratigraphic units			5	
		2. Major features of paleogeographic maps – Precambrian		**2nd APRIL,2024**	5	**10**
LOVELY BURMAN	**C10T: Phanerozoic Stratigraphy of India**	**Unit 1: Introduction**	1. Definition		1	
			2. Important Stratigraphic boundaries during Phanerozoic time in India - a. PrecambrianCambrian boundary, b. Permian-Triassic boundary, and c. Cretaceous-Tertiary boundary.	**2nd APRIL,2024**	2	**30**

		Unit 2: Important Palaeozoic successions in India	1. Paleozoic Succession of Kashmir		1	
			2. Stratigraphy Structure of Gondwana basins.		1	
			3. Mesozoic stratigraphy of India: a. Triassic successions of Spiti, b. Jurassic of Kutch, c. Triassic and Jurassic non marine successions of peninsular India (Upper Gondwana formations, relevant Formations of Rajasthan basin) d. Cretaceous, successions of Cauvery basins e. Lameta and Jabalpur Formations		1 1 2 1 1	
			4. Cenozoic stratigraphy of India: a. Kutch basin, b. Siwalik successions, c. Assam, Andaman and Arakan basins.		1 2 3	
			5. Stratigraphy and structure of Krishna-Godavari basin, Cauvery basin, Bombay offshore basin, Kutch and Saurashtra basins and their potential for hydrocarbon exploration		5	
		Unit 3: Stratigraphy of the intertrappeans	1. Deccan,		2	
			2. Rajmahal,		1	
			3. Sylhet Trap		1	
		Unit 4: Quaternary Geology	1. Definition 2. Principles of subdivision of		1 3	

		Quaternary succession in India			
	C10P: Phanerozoic Stratigraphy of India Lab	1. Study of geological map of India and identification of major Phanerozoic stratigraphic units. 2. Stratigraphic correlation of Phanerozoic stratigraphic units in geological map of India 3. Proterozoic supercontinent reconstructions	**2nd APRIL,2024**	3 4 3	**10**

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Department: **GEOLOGY**

Semester: Fourth

B.Sc. Honours

Skill Enhancement Course (SEC)

Name of the Teacher	**Title of the Teaching Assignment**	**Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus**	**Date of Commencement of the Assignment**	**Number of classes required to complete each unit**	**Total number of classes required to complete the assignment**
-	**SEC2P: Field Geology**	-	-	-	-

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Department: **GEOLOGY**

Semester: Fourth

B.Sc. Honours

Generic Elective (GE)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
ENAKSHI DAS & LOVELY BURMAN	**GE-4T Earth Resources**	**Unit 1**	1. Resource reserve definitions; mineral, energy and water resources	**2nd APRIL,2024**	3	**26**
			2. A brief overview of classification of mineral deposits with respect to processes of formation		3	
		Unit 1I	1. Difference between Energy, Power and Electricity		1	
			2. Renewable and Non- Renewable Sources of Energy		1	
			3. The concept and significance of Renewability: Social, Economic, Political and Environmental Dimension of Energy		2	
		Unit 1II	1. Resources of Natural Oil and Gas		3	
			2. Coal and Nuclear Minerals		3	
			3. Potential of Hydroelectric Power, Solar Energy, Wind, Wave and Biomass Based power and Energy		4	
		Unit 1V	1.Ground water resources in India and its role in economic development of the country		3	

			2. Current Scenario and Future Prospects of Solar Power, Hydrogen Power and Fuel Cells.		3	
	GE-4P Earth Resources	1. Study of coal ain Hand specimen		**2nd APRIL,2024**	2	**20**
		2. Plotting of major Indian oil fields on map of India			2	
		3. Problems related to assessment of possible oil exploration site from geological maps andsections.			4	
		4. Construction of cross section of mineral deposits from maps and drill hole data.			4	
		5. Estimation of reserves.			4	
		6. Preparation and interpretation of depth to water level maps and water level contourmaps			4	

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Department: **GEOLOGY**

Semester: Fourth

B.Sc. General

Core Course-DSC

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
APARUPA BANERJEE	**DSC1DT: Straigraphy and Palaeontology**	**Unit I:** Definition, Principle of stratigraphy; Geological Time Scale and stratigraphic classification; Physiographic division of India.	**2nd APRIL,2024**	4	**36**
		Unit II: Study of following Precambrian succession: Dharwar, Cuddapha, Vindhyan and Delhi Supergroups; Brief idea of Palaeozoic succession of northwestern Himalaya; Triassic of Spiti; Mesozoic type seccession of Kutch and Rajasthan; Cretaceous of Tiruchirapalli;		8	
		Unit III: Study of following type localities: Gondwana and Deccan Trap.		3	
		Unit IV: Palaeogene-Neogene sequences of northwest Himalaya and Assam.		2	
APARUPA BANERJEE	**DSC1DT: Straigraphy and Palaeontology**	**Unit-V**: Palaeontology: definition, Fossils: definition, characters, binomial nomenclature in taxonomy, mode of preservation, condition of fossilization and significance of fossils.		6	
		Unit VI: Morphology and geological distribution of brachiopods, pelecypods, cephalopods and gastropods.		8	
		Unit VII: Morphology and geological distribution		4	

		of trilobite, echinoidea.			
		Unit VIII: Evolutionary history of horse; Morphology, distribution and significance of Gondwana flora.		3	
	DSC1DP: Practical	1. Morphological characters, systematic position and age of fossil genera pertaining to brachiopods, pelecypods, cephalopods, gastropods, trilobite. 2. Preparation of lithostratigraphic maps of India showing distribution of important geological formations.	**2nd APRIL,2024**	10 4	**14**

6th Semester (Hons & Gen)

Department: **GEOLOGY**

Semester: Sixth

B.Sc. Honours

Core Course (CC)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
ENAKSHI DAS	**C13T: Geomorphology, Remote Sensing and GIS**	**Unit-1: Introduction to Geomorphology**	1. Introduction to Geomorphology	**27/02/2024**	1	
			2. Relationship between the landforms and the properties of earth material and differentkind of processes		1	
			3. Endogenic and Exogenic processes		1	
		Unit-2	1. Geoid, Topography, Hypsometry, Major Morphological features of the earth surface		2	
			2. Large Scale Topography - Plate tectonics overview. Large scale mountain ranges (with emphasis on Himalaya)		2	
		Unit-3	Surficial Processes and geomorphology, Weathering and associated landforms, Hill slopes Glacial, Periglacial processes and landforms, Fluvial processes and landforms, Aeolian Processes and landforms, Coastal Processes and landforms,		8	

			Landforms associated with igneous activities			
		Unit-4	1. Endogenic- Exogenic interactions. Rates of uplift and denudation. Tectonics and drainage development, Sea-level change, Long-term		4	
			landscape development. 2. Landform dating techniques.		2	
APARUPA BANERJEE	**C13T: Geomorphology, Remote Sensing and GIS**	**Unit-5: Remote Sensing, Concepts in Remote Sensing**	1. Concepts in Remote Sensing.	**27/02/2024**	1	**51**
			2. Sensors and scanners.		1	
			3. Satellites and their characteristics.		2	
			4. Data formats- Raster and Vector.		1	
		Unit-6: Photogeology	1.Types and acquisition of aerial photographs; Scale and resolution; Principles of stereoscopy, relief displacement, vertical exaggeration and distortion		4	
			2. Elements of air photo interpretation		2	
			3. Identification of sedimentary, igneous and metamorphic rocks and various aeolian, glacial, fluvial and marine landforms		2	
		Unit-7: Digital Image Processing	1. Image Errors, Rectification and Restoration, FCC, Image Enhancement, Filtering, Image Rationing.		4	
			2. Image classification and accuracy assessment.		2	
			3. GIS integration and Case studies- Indian Examples.		2	

		Unit-8: GIS and GPS	1. Datum, Coordinate systems and Projection systems. 2. Spatial data models and data editing. 3. Introduction to DEM analysis. 4. Concepts of GPS. 5. Integrating GPS data with GIS. 6. Applications in earth system sciences.		2 2 1 1 2 1	
	C13P: Geomorphology, Remote Sensing and GIS Lab	1.Reading topographic maps. Preparation of a topographic profile. 2. Preparation of longitudinal profile of a river. 3. Calculating Stream length gradient index 4. Morphometry of a drainage basin. 5. Interpretation of geomorphic processes from the geomorphology of the area. 6. Aerial Photo interpretation: Identification of sedimentary, igneous and metamorphic rocks and various aeolian, glacial, fluvial and marine landforms. 7. Introduction to DIP and GIS softwares. 8. Digital Image Processing exercises including analysis of satellite data in different bands and interpretation of various objects on the basis of their spectral signatures. 9. Registration of satellite data with a toposheet of the area. 10. DEM analysis: generating slope map, aspect map and drainage network map and its applications. 11. Use of stereoscope. Flight line determination using aerial photograph.		**27/02/2024**	4 2 2 4 2 4 6 6 4 6 4	**44**
A P A R U	**C14T: Engineering**	**Unit-1**		**27/02/2024**	2	**30**

	Geology	Role of engineering geologists in planning, design and construction of major man-made structural features			
		Unit-2 Site investigation and characterization		2	
		Unit-3 Foundation treatment; Grouting, Rock Bolting and other support mechanisms		2	
		Unit-4 Rock aggregates; Significance as Construction Material		2	
LOVELY BURMAN	**C14T: Engineering Geology**	**Unit-5** Concept, Mechanism and Significance of: a) Rock Structure Rating (RSR) b) Rock Mass Rating (RMR) c) Tunneling Quality Index (Q) Geological, Geotechnical and Environmental considerations for Dams and Reservoirs	**27/02/2024**	8	
		Unit-6 Tunnels and Tunneling Methods		2	
		Unit-7 Landslides: Causes, Factors and corrective/Preventive measures		4	
		Unit-8 Earthquakes: Causes, Factors and corrective/Preventive measures. Mitigating the damagecaused byEarthquake		4 4	
		Unit-9 Case histories related to Indian Civil Engineering Projects			
	C14P: Engineering Geology Lab	1. Computation of reservoir area, catchment area, reservoir capacity and reservoir life. 2. Merits, demerits & remedial measures based upon geological cross sections of project sites. 3. Computation of Index properties of rocks. 4. Computation of RQD, RSR, RMR and 'Q	**27/02/2024**	8 4 4 4	**20**

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Department: **GEOLOGY**

Semester: Sixth

B.Sc. Honours

Discipline Specific Elective (DSE)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
APARUPA BANERJEE, ENAKSHI DAS	**DSE3T: Exploration Geology**	**Unit-1: Mineral Resources**	Resource: Definitions, Mineral resources in industries – historical perspective and present scenario, classification of mineral deposits with respect to processes of formation; exploration strategies.	**27/02/2024**	6	**38**
		Unit-2: Prospecting and Exploration	1. Principles of mineral exploration 2. Prospecting and exploration: conceptualization, methodology and stages, Sampling, subsurface sampling including pitting, trenching and drilling 3. Geochemical exploration. 4. Outline of exploration techniques for ferrous and non-ferrous metals, limestone and		1 4 3 6	

			coal and petroleum.			
ENAKSHI DAS	**DSE3T: Exploration Geology**	**Unit-3: Evaluation of data**	Evaluation of sampling data - Mean, mode, median, standard deviation and variance		2	
		Unit-4: Drilling and Logging	1. Core and non-core drilling 2. Planning of bore holes and location of boreholes on ground Core-logging		2 2	
		Unit-5: Reserve estimations and Errors	1. Principles of reserve estimation, Factors affecting reliability of reserve estimation. 2. Reserve estimation based on geometrical models (square, rectangular, triangular and polygon blocks). 3. Regular and irregular grid patterns. 4. Statistics and error estimation		4 4 2 2	
	DSE3P: Practical	1. Identification of anomaly: Gravity and Magnetic. 2. Concept of weighted average in anomaly detection. 3. Geological cross-section. 4. Models of reserve estimation			4 4 4 4	**16**
ENAKSHI DAS	**DSE4T: Geodynamics**	**Unit-1: Introduction**	1.Definition. Continents and Oceans. Continental and Oceanic Crust. Internal Process of Earth.	**27/02/2024**	2	**41**

			2. Concept of lithosphere and asthenosphere. Physical character of lithosphere and asthenosphere. Concept of Plate		2	
			3. Concept of hot spot and mantle plume. Ophiloites. Palaeomagnetism		4	
		Unit-2: Continental Drift, Sea floor spreading and Plate tectonics	1.Wegner Continental Drift hypothesis and its evidences Continental position in the past		2	
			2.Sea-floor spreading process and its evidences.		2	
			3. Plate tectonics models and its evidences. Distribution of plates in the Earth		4	
		Unit-3: Plate and plate boundaries	1.Plates: Physical characters of plates. Macro and Micro Plates		2	
			2. Plate boundaries: Types, Character, Identification of boundaries. Movement of plates along boundaries. Plate velocities.		4	
			3. Volcanic arcs, island arcs, trenches, accretionary prisms, oceanic ridges, transform faults.		4	
APARUPA BANERJEE	**DSE4T: Geodynamics**		Magmatism in oceanic ridges and in subduction zones.		3	
		Unit-4:	1.Paleomagnetism and motion of plates		2	
			2.Driving mechanism of plates.		4	

			Plate tectonics and mantle Convection			
			3. Supercontinents and their breakup and assembly. Wilson cycle		6	

Department: **GEOLOGY**

Semester: Sixth

B.Sc. General

Core Course-DSE

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus		Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of class
LOVELY BURMAN	**DSE- T6 - Fossils and their applications**	**Unit-I**	**Introduction to Fossils**	**27/02/2024**	2	**25**
		Unit-II	**Species concept**		3	
		Unit-III	**Introduction to various fossils groups**		10	
		Unit-IV	**Application of fossils**		5	
		Unit-VII:	**Economic importance of fossils**		5	
	DSC1BP: Practical	1.Study of fossils showing various modes of fossilization. 2. Study of important fossils from India (list may be prepared by the department concern).		**27/02/2024**	10	**20**