



**Deccan Education Society's
Fergusson College (Autonomous), Pune**

Program Specific Outcomes (PSOs) and Course Outcomes (COs) 2019-20

**Department of Geology
Programme: B. Sc. Geology**

PSO No.	Program Specific Outcomes (PSOs) Upon completion of this programme the student will be able to
PSO1	Academic competence: (i) Describe the knowledge of physical and chemical properties of lithosphere and hydrosphere (minerals, rocks, soils and water etc.). (ii) Demonstrate the knowledge of geologic time and earth's history; dynamics of crustal materials with respect to Plate Tectonics theory, outline of regional geology of India. (iii) Articulate the methods of science and explain why current scientific knowledge is both contestable and testable by further inquiry and to appraise the relationship between different science communities of practice. Pursue further learning in Geology with reasonable knowledge, skills and interest.
PSO2	Personal and Professional Competence: (i) Demonstrate the competence in fundamental geological skills like- identification of various minerals and rocks in hand specimens and under the microscope. (ii) Express clearly and convincingly about ideas of science and technology.
PSO3	Research Competence (i) Interpret analytically aerial photographs, toposheets and satellite data. (ii) Interpret geological maps and construction of cross section, collection of field data and laboratory data.
PSO4	Entrepreneurial and Social competence (i) Evaluate data of the societal relevance of earth systems and the processes. (ii) Apply the knowledge of geology in the fields of Engineering, Mining, Hydrogeology and other areas to solve the problems. (iii) Collaborate in various geological services with demonstration of true values of leadership, co-operation, hard work, teamwork etc. during the field works, surveys and field visits. (iv) Illustrate overall personality traits like stage daring, communication skills, presentation which is essential for future career.

Course Outcomes (COs)		
F.Y. B.Sc. Semester I		
Title of the Course and Course Code	Earth System Science (GLY1101)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the origin and evolution of earth.	1
CO2	Explain the interior structure of the earth and plate movements.	2
CO3	Classify various types of landforms based on origin and characteristic features.	3
CO4	Compare various types of earth processes.	4
CO5	Evaluate various processes involved in shaping the earth.	5
CO6	Compile a report on landforms studied during field work.	6
F.Y. B.Sc. Semester II		
Title of the Course and Course Code	Mineral Science (GLY1102)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe various physical properties, optical properties ,crystal parameters in minerals and crystal models.	1
CO2	Compare various crystals based on symmetry, symmetry functions and explain crystal systems, mineral groups based on physical and optical properties.	2
CO3	Apply the understanding of physical, optical and other properties to determine the different groups and crystal systems.	3
CO4	Explain industrial applications and economic importance of various minerals.	4
CO5	Compare minerals on the basis of the different properties and estimate a few physical properties like hardness and specific gravity of minerals.	5
CO6	Prepare a report about mineral samples collected individually during the study tour.	6
F. Y. B.Sc. Semester II		
Title of the Course and Course Code	Palaeontology (GLY1201)	Number of Credits : 02

On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe various processes involved in the formation of fossils.	1
CO2	Classify various types of fossils on the basis of their morphological features.	2
CO3	Examine fossils in hand specimens or under microscope.	3
CO4	Explain significance of fossils in the interpretation of depositional environments.	4
CO5	Compare fossils belonging to various phyla.	5
CO6	Prepare a report on fossil samples collected during the study tour.	6
Title of the Course and Course Code	Petrology (GLY1202)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe various rock properties in hand specimens.	1
CO2	Compare various rocks based on mineral composition and textures.	2
CO3	Examine rocks in hand specimens.	3
CO4	Explain formation processes of different types of rocks ,different primary and secondary structures.	4
CO5	Compare rocks on the basis of different characters like mineral composition, textures, structures, depth of formation, colour etc.	5
CO6	Compose a report about rock samples collected individually during the study tour.	6
S.Y. B.Sc. Semester III		
Title of the Course and Course Code	Principles of Stratigraphy and Sedimentation (GLY2301)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the concept, various elements of stratigraphy and give their importance.	1
CO2	Explain the various processes of stratification.	2
CO3	Illustrate the various primary sedimentary structures formed in different depositional environments.	3
CO4	Classify sedimentary rocks on the basis of different characters like mineral composition, textures, structures, etc.	4

CO5	Compare the sedimentary facies associated with various depositional environments.	5
CO6	Prepare a report about sedimentary rock samples collected individually during the study tour.	6
Title of the Course and Course Code	Structural Geology (GLY2302)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	State various types of forces involved in deformation of rocks and describe attitude of structures.	1
CO2	Distinguish types of deformational structures.	2
CO3	Examine deformational structures produced by various deformational processes.	3
CO4	Classify deformational structures based on their characteristics features.	4
CO5	Evaluate the processes involved in formation of deformational structures.	5
CO6	Prepare a report of structural data collected during field work.	6
S.Y. B.Sc. Semester IV		
Title of the Course and Course Code	Global Tectonics and Geodynamics of Lithosphere (GLY2401)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the interior of the earth along with their physical and chemical properties.	1
CO2	Explain Earth's magnetic field and the theory of plate tectonics.	2
CO3	Classify the characteristic features of tectonic plates.	3
CO4	Analyze the processes involved in plate movements.	4
CO5	Compare the nature of boundaries of tectonic plates and associated features.	5
CO6	Reconstruct plate movements based on observed features in the field.	6
Title of the Course and Course Code	Environmental Geology and Geogenic Disaster (GLY2402)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level

CO1	Recall the concept of Environmental Geology and Geogenic disaster.	1
CO2	Discuss the various types of pollution.	2
CO3	Solve the various environmental issues by taking remedial measures.	3
CO4	Explain the concept of Environmental Impact Assessment.	4
CO5	Classify the geogenic disaster and evaluate geogenic disaster prone areas.	5
CO6	Prepare a report on any geogenic disaster prone area.	6

T.Y. B.Sc Semester V

Title of the Course and Course Code	MINERALOGY (GLY3501)	Number of Credits : 02
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On completion of the course, the students will be able to:	Bloom's Cognitive level
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CO1	Recall principles associated with optics, physical and optical mineral properties.	1
CO2	Compare various mineral groups on the basis of physical and optical mineral properties along with their paragenesis.	2
CO3	Apply the knowledge of minerals to understand their formation processes.	3
CO4	Classify crystals into different systems.	4
CO5	Determine minerals on the basis of optical characters.	5
CO6	Compile mineral data by using physical and optical properties.	6

Title of the Course and Course Code	ENGINEERING GEOLOGY (GLY3502)	Number of Credits : 02
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On completion of the course, the students will be able to:	Bloom's Cognitive level
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CO1	Describe the concepts of engineering geology and outline the applications of geology in engineering projects.	1
CO2	Discuss various engineering properties of rocks and aggregates.	2
CO3	Apply the knowledge of various engineering properties of rocks in engineering projects.	3
CO4	Explain the types of raw materials used in engineering projects.	4
CO5	Evaluate data related to engineering classification of rocks.	5
CO6	Compile geological data based on various case studies related to site selection of engineering structures.	6

Title of the Course and Course Code	Structural Geology (GLY3503)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall description associated with various structures and basic concepts of plate tectonics.	1
CO2	Compare different types of rock deformations.	2
CO3	Apply the mechanical principles to understand formation of structures.	3
CO4	Analyse the structural data.	4
CO5	Evaluate the structural data.	5
CO6	Prepare and validate the field structural data by using various structural analyses.	6
Title of the Course and Course Code	GEOLOGY OF INDIA I (GLY3504)	Number of Credits : 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall principles of stratigraphy, geological time scale and elements of continents and oceans.	1
CO2	Explain the criteria used in developing the Precambrian Stratigraphy of India.	2
CO3	Classify cratons, mobile belts and platform basins of India on the basis of lithological and stratigraphic characters.	3
CO4	Compare various cratons, mobile belts and platform basins of India.	4
CO5	Determine economic importance of Precambrian stratigraphic units of India.	5
CO6	Prepare a report on rock samples collected from various stratigraphic horizons.	6
Title of the Course and Course Code	GEOMORPHOLOGY AND REMOTE SENSING (GLY3505)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify various photo recognition elements from remotely sensed data.	1
CO2	Discuss various geomorphic features, lithologies and structural elements from remotely sensed data.	2

CO3	Apply remote sensing principles and photo recognition elements to identify various features.	3
CO4	Analyze remotely sensed data to draw conclusions regarding geological history of an area.	4
CO5	Compare between different types of remotely sensed data and evaluate its utility.	5
CO6	Assemble remote sensing and geomorphological data and prepare a report.	6
Title of the Course and Course Code	HYDROGEOLOGY (GLY3506)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the status of groundwater in India and the world.	1
CO2	Discuss basic concepts related to fluid motion in porous media.	2
CO3	Illustrate the concept of aquifers and their boundaries.	3
CO4	Compare the status of groundwater in various physiographic divisions of India.	4
CO5	Determine appropriate techniques for hydrogeological survey.	5
CO6	Perform hydrogeological surveys and prepare field reports.	6
Title of the Course and Course Code	GEOLOGY PRACTICAL I (GLY3507)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify megascopic and microscopic and describe various engineering properties of rocks.	1
CO2	Infer standard parameters from twinned crystals	2
CO3	Classify different crystals on the basis of hemimorphic and hemihedral forms	3
CO4	Compare between crystals within Cubic system and Hexagonal system.	4
CO5	Determine RQD from given data and critique about site selection for construction of engineering structures from geological data.	5
CO6	Generate the axial ratios of crystals from given data.	6

Title of the Course and Course Code	GEOLOGY PRACTICAL II (GLY3508)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe various structural features on the basis of geometrical data.	1
CO2	Compute reduced level of a bore hole from given data.	2
CO3	Interpret a given geological map of an area and construct a cross section.	3
CO4	Compare the stratigraphy of various Precambrian units of India	4
CO5	Measure plunge and rake of a linear structural feature by geometric and stereographic methods.	5
CO6	Prepare a geological map from given data.	6
Title of the Course and Course Code	GEOLOGY PRACTICAL III (GLY3509)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify relation between rainfall and groundwater levels from given data	1
CO2	Compute the scale of aerial photographs and base flow contribution from given stream flow data	2
CO3	Examine different remote sensing data using photo recognition elements and calculate specific capacity of wells from pumping test data	3
CO4	Analyze lineament orientations from given remote sensing data and groundwater quality using various methods.	4
CO5	Measure different morphometric parameters in a given drainage basin and determine recharge and discharge areas of groundwater from given data.	5
CO6	Compile observations from satellite images and aerial photos and construct water table contours from well inventory data.	6
Title of the Course and Course Code	TECHNIQUES IN SEDIMENTOLOGY (GLY3511)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level

CO1	Describe various techniques in sedimentology.	1
CO2	Discuss the systematic approach to field log preparation.	2
CO3	Illustrate the concept of granulometric, provenance and paleocurrent studies.	3
CO4	Analyse the given sedimentological data.	4
CO5	Evaluate the sedimentological data to determine depositional environment and source area.	5
CO6	Prepare and validate the given sedimentological data by using bivariate and multivariate plots.	6
Title of the Course and Course Code	GEMMOLOGY (GLY3512)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the attributes of gemstones	1
CO2	Discuss the use of different gem instruments in identification of the gemstones	2
CO3	Examine the treatments used in the gemstones to enhance their attributes	3
CO4	Compare various gemstones based on their physical and optical properties.	4
CO5	Discriminate between synthetic and natural gemstones	5
CO6	Organize various gemstones into different groups based on their physical and optical properties	6
T. Y. B.Sc. Semester VI		
Title of the Course and Course Code	ECONOMIC GEOLOGY (GLY3601)	Number of Credits : 02
Course Outcomes (COs) On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe various ore minerals on the basis of their physical and chemical properties.	1
CO2	Discuss various processes involved in ore formation.	2
CO3	Outline the information about the geographical occurrence of different ores in India.	3
CO4	Compare various metallic and non-metallic deposits.	4
CO5	Justify occurrence of metallic and non-metallic deposits in an area on the basis of geological parameters.	5
CO6	Prepare a report about metallic and non-metallic deposits collected from the field.	6

Title of the Course and Course Code	OCEANIC AND ATMOSPHERIC SCIENCES (GLY3602)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define structure of atmosphere and oceans.	1
CO2	Discuss basic concepts related to oceanic and atmospheric circulation.	2
CO3	Illustrate the concept of Coupled Ocean-Atmosphere Systems.	3
CO4	Analyze the types of clouds and oceanic floor features.	4
CO5	Review greenhouse effect, climate change and related concepts.	5
CO6	Compile different types of climate change related data.	6
Title of the Course and Course Code	IGNEOUS AND METAMORPHIC PETROLOGY (GLY3603)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall textural and mineralogical characters of igneous and metamorphic rocks.	1
CO2	Categorize igneous and metamorphic rocks on the basis of physical and optical properties.	2
CO3	Examine and classify igneous and metamorphic rocks.	3
CO4	Analyze ACF and Norm Data.	4
CO5	Compare different metamorphic facies, igneous rock kinds and provinces.	5
CO6	Prepare a report about the rock samples collected from the field.	6
Title of the Course and Course Code	GEOLOGY OF INDIA II (GLY3604)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall principles of stratigraphy and geological time scale giving special emphasis on Phanerozoic Eon.	1

CO2	Discuss the criteria used in developing the Phanerozoic Stratigraphy of India.	2
CO3	Classify Palaeozoic, Mesozoic and Cenozoic Systems or Groups on the basis of lithology, stratigraphic characters and boundary problems.	3
CO4	Compare various events during Phanerozoic Eon.	4
CO5	Determine the economic importance of rocks associated with various Phanerozoic basins of India.	5
CO6	Prepare a report on rock samples collected from various stratigraphic horizons.	6
Title of the Course and Course Code	PETROLEUM GEOLOGY (GLY3605)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe occurrence and distribution of petroleum within rocks.	1
CO2	Explain the origin, migration and accumulation of petroleum.	2
CO3	Classify various reservoirs and traps.	3
CO4	Categorise various types of petroliferous basins of India.	4
CO5	Evaluate geological occurrences of petroleum.	5
CO6	Organise the geological data from various petroliferous basins.	6
Title of the Course and Course Code	GEOPHYSICAL PROSPECTING (GLY3606)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall fundamental concepts associated with gravity, magnetism, electricity and wave motion.	1
CO2	Summarize various geophysical properties of the earth related to gravity, magnetism, electricity and wave motion.	2
CO3	Apply geophysical concepts in prospecting of economically important deposits.	3
CO4	Analyse and calculate various geophysical properties of the earth using geophysical data.	4
CO5	Evaluate the geophysical character of rocks.	5

CO6	Compile and validate geophysical data using field observations.	6
Title of the Course and Course Code	GEOLOGY PRACTICAL IV (GLY3607)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify economic and industrial minerals in hand specimens and name major oceanic and atmospheric current systems.	1
CO2	Give examples of occurrence of economic deposits in India.	2
CO3	Classify different economic minerals according to their chemical composition.	3
CO4	Compare geological occurrence of different economically important deposits and analyse different types of meteorological data.	4
CO5	Determine the use of different economically important deposits in industries.	5
CO6	Construct bathymetric profiles from given bathymetric charts.	6
Title of the Course and Course Code	GEOLOGY PRACTICAL V (GLY3608)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall different rock textures and structures.	1
CO2	Categorize various megascopic and microscopic rocks using physical and optical properties.	2
CO3	Examine different rocks and plant fossils in hand specimen.	3
CO4	Compare the stratigraphy of various Phanerozoic units of India.	4
CO5	Determine nature of protolith by ACF diagrams.	5
CO6	Perform CIPW Norm calculation for silica saturated igneous rocks.	6
Title of the Course and Course Code	GEOLOGY PRACTICAL VI (GLY3609)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level

CO1	Identify various subsurface structures from given seismic profiles	1
CO2	Infer the occurrence of petroleum deposits from given lithological data	2
CO3	Classify the rocks on the basis of porosity and permeability of rocks	3
CO4	Compare petroliferous basins of India.	4
CO5	Determine subsurface structure on the basis of geophysical data.	5
CO6	Construct structural contours map, isopach maps and fence diagram for demarcation of petroliferous horizons	6
Title of the Course and Course Code	GROUNDWATER DEVELOPMENT AND MANAGEMENT (GLY3611)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the status of groundwater in India and the world.	1
CO2	Discuss basic concepts related to groundwater development and management.	2
CO3	Illustrate the concept of managed aquifer recharge, participatory groundwater management and springshed development.	3
CO4	Compare the status of groundwater in various physiographic divisions of India.	4
CO5	Determine appropriate techniques for groundwater development and management.	5
CO6	Perform hydrogeological surveys and prepare field reports.	6
Title of the Course and Course Code	GEOLOGICAL FIELD METHODS (GLY3612)	Number of Credits: 02
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List different standard lithological symbols and colour codes for preparation of geological maps.	1
CO2	Interpret toposheets, remote sensing and other resources for reconnaissance.	2
CO3	Demonstrate the use of field equipments.	3
CO4	Analyse different types of geological data and maps.	4
CO5	Measure attitude, thickness, orientations of different features observed in the field.	5
CO6	Write a report on different minerals, rocks, fossils and structural features observed during the study tour.	6

