
**Deccan Education Society's
FERGUSSON COLLEGE (AUTONOMOUS),
PUNE**

**Syllabus
for**

S.Y.B.Sc. (Geology)

[Pattern 2019]

(B.Sc. Semester-III and Semester-IV)

From Academic Year

2020-21

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

S.Y.B.Sc. Subject (Pattern 2019)

From academic year 2020-21

Particulars	Name of Paper	Paper Code	Title of Paper	No. of Credits
S.Y. B.Sc. Semester III	Theory Paper - 1	GLY2301	Principles of Stratigraphy and Sedimentation	2
	Theory Paper - 2	GLY2302	Structural Geology	2
	Practical Paper - 1	GLY2303	Geology Practical related to GLY 2301 and 2302 Practical -III	2
S.Y. B.Sc. Semester IV	Theory Paper - 3	GLY2401	Global tectonics and geodynamics of the lithosphere	2
	Theory Paper - 4	GLY2402	Environmental geology and geogenic disasters	2
	Practical Paper - 2	GLY2403	Geology Practical related to GLY 2401 and 2402+ 4-5 Days Field Component Practical -IV	2

S.Y. B.Sc. Semester III**Paper -1(GLY2301)Paper title: Principles of Stratigraphy and Sedimentation****[Credits-2]****Course Outcomes**

At the end of this course, students will be able to

- CO1** Understand the changes that occurred in the history of the earth and relate them to their field observations.
- CO2** Understand the framework of the stratigraphy of India.
- CO3** Understand the chronological arrangements of rocks.
- CO4** Understand the different processes of formation of sedimentary rocks.

Unit	Details	Lectures
I	<p>Principles of Stratigraphy and Stratification</p> <p>A) Introduction: Definition, Development of stratigraphic concepts, Importance of Stratigraphy, Various principles of Stratigraphy</p> <p>B) Stratigraphic Classification & Nomenclature: Study of stratigraphic elements, Lithostratigraphy, Chronostratigraphy, Biostratigraphy, Inter-relationship between lithostratigraphic, Chronostratigraphic and Biostratigraphic units.</p> <p>C) Methods of Collecting Stratigraphic Data: Outcrop and Subsurface procedures.</p> <p>D) Stratification: Introduction to concept of basin, Processes of stratification, Controlling factors-physical, chemical and biological, Vertical succession, alternations, varves, cycles.</p> <p>E) Stratigraphic Correlation: Definition and evidence for correlation- physical and palaeontological</p>	[18]
II	<p>Sedimentation:</p> <p>A) Nature of sediment formation, transport and deposition: Processes of sediment formation, source of sediments, Transportation of sediments and deposition of sediments, Wilson's cycle, lithification, diagenesis and post depositional changes, carbonates and other precipitates</p> <p>B) Significance of Textures of sedimentary rocks and primary sedimentary structures: detrital, chemical and biochemical</p> <p>C) Sedimentary facies: Introduction to sedimentary facies: Definition, nomenclature & types of Sedimentary facies.</p>	[18]

	<p>D) Depositional environments: Introduction to depositional environment and classification.</p> <p>E) Classification of sedimentary rocks: Classification of sandstone and limestone</p>	
--	--	--

Books Recommended:

1. Krumben and Sloss (1963) Stratigraphy and Sedimentation, W.H.Freeman
2. Friedman & Sanders, (1978) Principles of Sedimentology. John Wiley and sons.
3. Pettijohn, F.J., (1975), Sedimentary rocks, Harper & Bros. 3rdEd.
4. Sengupta. S., (1997), Introduction to sedimentology.Oxford-IBH.
5. Pettijohn F.J. (1984) Sedimentary Rocks (3rd Edition), CBS Publishers and Distributors, NewDelhi.
6. IUGS Stratigraphic nomenclature
7. GSI stratigraphic nomenclature

S.Y. B.Sc. Semester III
Paper -2 (GLY2302) Paper title: Structural Geology

[Credits-2]

Course Outcomes

At the end of this course, students will be able to

- CO1** Understand the geometry of the rock structures.
CO2 Understand the mechanism of the evolution of rock structures.
CO3 Understand the deformation of rock structures.
CO4 Understand the different geological structures in the field.

Unit	Details	Lectures
I	<p>Introduction to Structural Geology</p> <p>A) Introduction- Definition and its relation with other branches of geology, Tectonic and Non-tectonic structures, Scale of tectonic structures (Micro, Meso, Macro&Regional)</p> <p>B) Components of deformation - Force, Confining / Hydrostatic pressure & differential forces, Stress & Strain, Rupture strength, Ultimate strength & Fundamental strength, Factors controlling rock deformation: Confining pressure, temperature, time, solution</p> <p>C) Planar/Linear Structures- Attitude of planar feature - Strike and Dip, Attitude of Linear Feature, Bearing, Plunge and Rake of Lineation and linear structures.</p> <p>D) Determination of Top of Beds with The Help of Primary Structures (Sedimentary & Igneous)</p> <p>E) Unconformities</p>	[18]
II	<p>Unit II -Deformation Structures</p> <ul style="list-style-type: none"> • Definition, Elements, Types and Nature of – Joints, Fractures, Shear zones, Faults and Folds 	[18]

Reference books:

1. Jain, A.K., (2014) An introduction to structural geology. Textbook series in Geological Sciences for Graduate Students, Geological Society of India, Bangalore
2. Billings, M.P., (1972) Structural Geology. Prentice Hall
3. Davis, G.R., (1984) Structural Geology of Rocks and Region. John Wiley

S.Y. B.Sc. Semester III

Subject_____Paper -3 (GLY2303)Paper title: Geology Practical related to GLY 2301 and 2302

[Credits-2]

Course Outcomes

At the end of this course, students will be able to

CO1

CO2

CO3

CO4

List of practical's(Compulsory 10 + 2 Activity)

S.Y. B.Sc. Semester IV

Paper -1 (GLY2401) Paper title: Global tectonics and geodynamics of the lithosphere
[Credits-2]

Course Outcomes

At the end of this course, students will be able to

- CO1** Understand the dynamic nature of the earth processes.
- CO2** Understand the interior structure of the earth.
- CO3** Understand the formation and destruction of plates.
- CO4** Understand the concept of different geological theories.

Unit	Details	Lectures
I	<p>Geodynamics of Lithosphere</p> <p>A. Evolution and Structure of Lithosphere, Asthenosphere, core etc.</p> <p>B. Lithospheric – Asthenospheric Interactions</p> <p>C. Concept of isostasy</p> <p>D. Earth's Magnetic field & Geodynamo</p> <p>E. Historical background of the plate tectonic theory</p>	[18]
II	<p>Plate tectonics</p> <p>A. Characteristics of lithospheric plates, Concept of plate margin & plate boundary.</p> <p>B. Three plate boundaries - (Divergent, Convergent & Transform fault -description & examples)</p> <p>C. Present motion of world's large plates.</p> <p>D. Concept of triple junctions with their examples.</p> <p>E. Concept of plate tectonics.</p> <p>F. Concept of hot plumes & hot spots with examples</p>	[18]

Reference books:

1. Patwardhan, A.M. (2012) The dynamic Earth System, PHI Learning Pvt.Ltd.,
2. Moores E.M. and Twiss R.J. (1995) Tectonics, W. H.Freeman
3. Condie, K.C. (1989) Plate Tectonics & Crustal Evolution, Butterworth-Heinemann
4. Billings, M.P. (1942) Structural Geology, Prentice Hall,
5. Badgley, P. C. (1965) Structural & Tectonic Principles, Harper & Row
6. Valdiya K.S. (2014) Making of India, Springer.
7. Helmut G.F. Winkler (1967, 1986), Petrogenesis of metamorphic rocks, springer-verlag

S.Y. B.Sc. Semester IV**Paper -2 (GLY2402) Paper title:** Environmental geology and geogenic disasters**[Credits-2]****Course Outcomes**

At the end of this course, students will be able to

- CO1** Understand the basic fundamentals of earth science as applied to the interaction between human activity and the natural environment.
- CO2** Understand the occurrence and availability of both surface and subsurface water resources and the role of hydrological cycle and the pollution.
- CO3** Understand the role of plate tectonics in causing earthquakes and how this understanding can aid the assessment of seismic hazards.
- CO4** Understand the role of Geologist in disaster management plan.

Unit	Details	Lectures
I	Environmental Geology A) Scope, Concepts and Objectives of Environmental Geology. B) Physical, Biological and Socio-geological Environment, Bio-geochemical cycles. C) Environmental Impact Assessment - Introduction and Methodology D) Pollution - Water quality, BIS/ UNESCO/WHO Standards, Organic, inorganic and Heavy metal pollution, Sampling methods & monitoring.	[18]
II	Geogenic disasters and hazards, and Solid Waste Management A) Definition, type, natural hazard zones, Distinction between hazard and disaster B) Impact assessment, Natural hazard zonation maps C) Role of Geologists in disaster management plan. D) Geogenic hazards – Earthquake, Volcanoes, Cyclones, Floods, Mass movements, Mining Hazards, Coastal Hazards (Tsunami) E) Conservation of Natural Resources F) Solid Waste Management - Generation, Collection, Segregation, Characterization, Disposal, Recycling and Reuse, Its effects with geological perspective G) Urban Geology	[18]

Books Recommended:

1. Valdiya, K. S., (1987) Environmental Geology - Indian Context. Tata McGraw Hill New Delhi.
2. Keller, E. A., (2000) Environmental Geology. Shales E. Merrill Publishing Co., Columbus, Ohio.
3. Montgomery, C., (1984) Environmental Geology. John Wiley and Sons, London.
4. Bird, Eric, (2000) Coastal Geomorphology: An Introduction. John Wiley

- &Sons, Ltd.Singapore.
5. Liu, B.C., (1981) Earthquake Risk and Damage, Westview.
 6. Sharma J. P., Environmental Studies, Laxmi Publications (P) Ltd, New Delhi UGC Document on LOCF Geology 42
 7. Urban Geology: Geology & cities.

S.Y. B.Sc. Semester IV

Subject_____Paper -3 (GLY2403)Paper title: Geology Practical related to GLY 2401 and 2402+ 4-5 Days Field Component

[Credits-2]

Course Outcomes

At the end of this course, students will be able to

CO1

CO2

CO3

CO4

List of practical's (Compulsory 10 + 2 Activity)