



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

**Learning Outcomes-Based Curriculum**  
for 3/4 years B. Sc. / B. Sc. (Honours) Programme

as per guidelines of

**NEP-2020**

for

**F. Y. B. Sc. (Geology)**

With effect from Academic Year

**2024-2025**

<b>Program Outcomes (POs) for B. Sc. Programme</b>	
<b>PO1</b>	<b>Disciplinary Knowledge:</b> Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate programme. Execute strong theoretical and practical understanding generated from the specific graduate programme in the area of work.
<b>PO2</b>	<b>Critical Thinking and Problem solving:</b> Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
<b>PO3</b>	<b>Social competence:</b> Display the understanding, behavioural skills needed for successful social adaptation, work in groups, exhibits thoughts and ideas effectively in writing and orally.
<b>PO4</b>	<b>Research-related skills and Scientific temper:</b> Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research.
<b>PO5</b>	<b>Trans-disciplinary knowledge:</b> Integrate different disciplines to uplift the domains of cognitive abilities and transcend beyond discipline-specific approaches to address a common problem.
<b>PO6</b>	<b>Personal and professional competence:</b> Performing dependently and also collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.
<b>PO7</b>	<b>Effective Citizenship and Ethics:</b> Demonstrate empathetic social concern and equity centred national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
<b>PO8</b>	<b>Environment and Sustainability:</b> Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
<b>PO9</b>	<b>Self-directed and Life-long learning:</b> Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

<b>PSO No.</b>	<b>Program Specific Outcomes (PSOs) Upon completion of this programme the student will be able to</b>
<b>PSO1</b>	<p><b>Academic competence:</b></p> <p>(i) Describe the knowledge of physical and chemical properties of lithosphere and hydrosphere (minerals, rocks, soils and water etc.).</p> <p>(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.</p> <p>(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.</p>
<b>PSO2</b>	<p><b>Personal and Professional Competence:</b></p> <p>(i) Demonstrate the competence in fundamental geological skills like- identification of various minerals and rocks in hand specimens and under the microscope.</p> <p>(ii) Express clearly and convincingly about ideas of science and technology.</p>
<b>PSO3</b>	<p><b>Research Competence</b></p> <p>(i) Interpret analytically aerial photographs, toposheets and satellite data.</p> <p>(ii) Interpret geological maps and construction of cross section, collection of field data and laboratory data.</p>
<b>PSO4</b>	<p><b>Entrepreneurial and Social competence</b></p> <p>(i) Evaluate data of the societal relevance of earth systems and the processes.</p> <p>(ii) Apply the knowledge of geology in the fields of Engineering, Mining, Hydrogeology and other areas to solve the problems.</p> <p>(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.</p> <p>(iv) Illustrate overall personality traits like stage daring, communication skills, presentation which is essential for future career.</p>

**Fergusson College (Autonomous), Pune**  
**Proposed First Year Curriculum as per NEP 2020**  
**Department of Geology**  
**Structure for Major / Minor**

Semester	Paper	Paper Code	Paper Title	Type	Credits
<b>I</b>	<b>Discipline Specific Core DSC</b>	<b>GLY-1001</b>	<b>Mineral Science</b>	<b>Theory</b>	<b>2</b>
		<b>GLY-1011</b>	<b>Geology Practical - 1</b>	<b>Practical</b>	<b>2</b>
	<b>Open Elective 1</b>	<b>GLY-1021</b>	<b>Introduction to Geosciences</b>	<b>Theory</b>	<b>2</b>
<b>II</b>	<b>Discipline Specific Core DSC</b>	<b>GLY-1002</b>	<b>Petrology</b>	<b>Theory</b>	<b>2</b>
		<b>GLY-1012</b>	<b>Geology Practical - II</b>	<b>Practical</b>	<b>2</b>
	<b>Open Elective 2</b>	<b>GLY-1022</b>	<b>World of Minerals and gemstones</b>	<b>Theory</b>	<b>2</b>
	<b>Skill Enhancement Course SEC-1</b>	<b>GLY-1032</b>	<b>Earth System Science</b>	<b>Theory</b>	<b>2</b>

*\*OE – Open Elective, SEC- Skill Enhancement Course*

**Teaching and Evaluation (Only for FORMAL education courses)**

<b>Course Credits</b>	<b>No. of Hours per Semester Theory/Practical</b>	<b>No. of Hours per Week Theory/Practical</b>	<b>Maximum Marks</b>	<b>CE 40 %</b>	<b>ESE 60%</b>
<b>1</b>	<b>15 / 30</b>	<b>1 / 2</b>	<b>25</b>	<b>10</b>	<b>15</b>
<b>2</b>	<b>30 / 60</b>	<b>2 / 4</b>	<b>50</b>	<b>20</b>	<b>30</b>
<b>3</b>	<b>45 / 90</b>	<b>3 / 6</b>	<b>75</b>	<b>30</b>	<b>45</b>
<b>4</b>	<b>60 / 120</b>	<b>4 / 8</b>	<b>100</b>	<b>40</b>	<b>60</b>

**Eligibility: As per the rules and regulations of Savitribai Phule Pune University (SPPU)**

<b>F. Y. B. Sc. Semester-I</b>		
<b>GLY-1001</b>	<b>DSC 1- Mineral Science</b>	<b>Credits:02 Hours:30</b>
<b>Course Outcomes (COs)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
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

<b>Unit</b>	<b>Topic</b>	<b>Number of hours</b>
I	<p><b>A) INTRODUCTION TO MINERALS</b></p> <ul style="list-style-type: none"> <li>➤ Definition of mineral</li> <li>➤ Branches of mineralogy</li> <li>➤ Geological processes of mineral formation: <ul style="list-style-type: none"> <li>• Crystallization from melt</li> <li>• Crystallization from Solution. (evaporation and precipitation)</li> <li>• Crystallization from Vapour (sublimation)</li> <li>• Metamorphic processes</li> <li>• Alteration and related weathering (oxidation and supergene sulphide enrichment)</li> </ul> </li> </ul> <p><b>B) PROPERTIES OF MINERALS</b></p> <ul style="list-style-type: none"> <li>➤ Physical properties of minerals: <ul style="list-style-type: none"> <li>• Colour, streak, lustre, cleavage and partings, fracture, form, hardness and specific gravity</li> <li>• Properties based on magnetism, electrical properties, and radioactivity, luminescence (phosphorescence and fluorescence)</li> </ul> </li> <li>➤ Optical properties of minerals: <ul style="list-style-type: none"> <li>• Nature of light – ordinary and plane polarized light, double refraction of light (with the help of calcite crystal), Nicol's prism and polaroids, petrological microscope, opaque and non-opaque minerals</li> <li>• Introduction to optical properties:</li> </ul> </li> </ul>	15

	<ul style="list-style-type: none"> <li>▪ In plane polarized light: Colour, form, cleavage, cracks, relief, twinkling, pleochroism</li> <li>▪ In between crossed Nicols: Isotropism, anisotropism, extinction positions (straight, oblique, symmetrical and determination of extinction angle), interference colours, twinning (simple, multiple and cross hatching)</li> </ul>	
II	<p><b>A) CRYSTAL CHEMISTRY AND CRYSTALLOGRAPHY</b></p> <ul style="list-style-type: none"> <li>➤ Crystal Chemistry <ul style="list-style-type: none"> <li>• Goldschmidt classification of elements</li> <li>• Isomorphism, polymorphism, pseudo morphism</li> <li>• Silicate structures</li> </ul> </li> <li>➤ Crystallography <ul style="list-style-type: none"> <li>• Crystal morphology – faces, forms, edges, solid angles, interfacial angle and its measurement by contact goniometer, law of constancy of interfacial angle.</li> <li>• Symmetry of crystals – Elements of Symmetry-Plane, axis and center of symmetry; crystallographic and geometrical symmetry.</li> <li>• Crystallographic axes, lettering and order of crystallographic axes, parameters, axial ratio, indices, parameter system of Weiss, index system of Miller, Law of rational indices.</li> <li>• Study of following crystallographic systems with respect to their elements of symmetry, crystallographic axes and their forms with indices. <ul style="list-style-type: none"> <li>Orthorhombic (Type: Barytes), Tetragonal (Type: Zircon), Cubic (Type: Galena), Hexagonal (Type: Beryl), Monoclinic (Type: Gypsum), Triclinic (Type: Axinite)</li> </ul> </li> </ul> </li> </ul> <p><b>B) MINERAL GROUPS AND USES OF MINERALS</b></p> <ul style="list-style-type: none"> <li>➤ Mineral Groups- Study of following mineral groups with respect to their silicate structure, chemical composition, physical and optical properties and examples: Olivine, Pyroxene, Amphibole, Mica, Feldspar and Silica</li> <li>➤ Uses of minerals</li> </ul>	15
<p>References:</p> <ol style="list-style-type: none"> <li>1. Dexter Perkins, 1998, Mineralogy, 3<sup>rd</sup> Edition, Pearson Education</li> <li>2. Kevin Hefferan and John O'Brien, 2010 Earth Materials, A John Wiley &amp; Sons, Ltd., Publication</li> <li>3. Gribble, C. D., 1988, Rutley's Elements of Mineralogy, 27th Edition, Unwin Hyman, London</li> <li>4. Dana, E. S., and Ford, W. E., 1922, Text Book of Mineralogy, John Wiley, New York, 748p.</li> <li>5. Deer, W. A., Howie, R. A. and Zussman, J., 2013, An Introduction to Rock Forming Minerals, Essex: Longman Scientific and Technical; New York: Wiley., 696pp.</li> <li>6. Berry, L. G., Dietrich, R. V., and Mason, B., 1985, Mineralogy, CBS Publishers &amp; Distributors, India, 561p</li> </ol>		

## F. Y. B. Sc. Semester-I

F. Y. B. Sc. Semester-I		
<b>GLY-1011</b>	<b>DSC 2- Geology Practical I</b>	<b>Credits: 02 Hours: 60</b>
<b>Course Outcomes (COs)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
CO1	Identify various megascopic minerals using different physical properties	1
CO2	Explain properties of ore minerals	2
CO3	Classify minerals into different mineral groups on the basis of physical properties	3
CO4	Distinguish between crystal systems on the basis of elements of symmetry and forms.	4
CO5	Determine interfacial angle using contact goniometer.	5
CO6	Perform experiment and calculate specific gravity.	6

Expt. No.	Title of Experiment
1	Study of physical properties of Minerals-I
2	Study of physical properties of Minerals-II
3	Megascopic study of minerals-I
4	Megascopic study of minerals-II
5	Megascopic study of ore minerals
6	Study of elements of symmetry in crystals
7	Study of crystal Systems-I
8	Study of crystal Systems-II
9	Study of crystal Systems-III
10	Finding interfacial angle using contact goniometer
11	Activity- study of cavity minerals from Deccan Traps
12	



## F. Y. B. Sc. Semester-I

F. Y. B. Sc. Semester-I		
<b>GLY-1021</b>	<b>Open Elective 1- Introduction to Geosciences</b>	<b>Credits:02 Hours:30</b>
<b>Course Outcomes (Cos)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
CO1	Describe the origin and evolution of earth and some geogenic disasters occurred in the earth's history.	1
CO2	Explain the interior structure of the earth and plate movements.	2
CO3	Classify various types of landforms and minerals and rocks based on origin and characteristic of features.	3
CO4	Compare various types of earth processes and different types of rocks on the basis of their genesis and characters.	4
CO5	Summarize the various landforms and their causes of formations	5
CO6	Compile the various processes and events involved in shaping of earth.	6

Unit No.	Title of Unit and Contents	No. of Hours
<b>I</b>	<p><b>Introduction:</b> Definition of geology, its divisions, sub-divisions and scope</p> <p><b>Planet Earth-</b> Origin, Size, Shape and density</p> <p><b>The Earth's Atmosphere, Hydrosphere, Lithosphere and Biosphere</b></p> <p><b>Interior of the Earth-</b> Brief introduction and characteristics of Crust, Mantle and Core</p> <p><b>Plate Tectonics-</b> Introduction to the theory and salient features of different plate boundaries</p> <p><b>Volcanoes:</b> - Genesis, Types, Products and Distribution</p> <p><b>Earthquakes-</b> Definition, terminology, causes, Seismic ones of the world</p> <p><b>Types of Mountains:</b> Fold, fault block, volcanic and residual.</p>	<b>15</b>

<b>II</b>	<p><b>Concept of Weathering, erosion and denudation</b>  <b>Study of various erosional and depositional landforms resulting from the action of: River, Wind, Sea and Glaciers</b>  <b>Age of the Earth:</b> A brief account of the historical methods and different dating methods  <b>Geological Time Scale and Ancient Life</b>  <b>Introduction to the minerals-</b> Definition, examples and their uses  <b>Introduction to the rocks-</b> Igneous, Sedimentary and Metamorphic rocks with their salient features and general distribution of these rocks in India.  <b>Geogenic Disasters-</b> Study of Different geogenic disasters with the help of examples</p>	<b>15</b>
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. General Geology: Radhakrishnan</li> <li>2. Holmes' Principles of Physical Geology: Edited by P. McL. D. Duff</li> <li>3. Plate tectonics and Crustal evolution : Condie</li> <li>4. Our evolving planet : Bergen, Alma Mater Fortag</li> <li>5. Geomorphology and Global Tectonics: Summerfield M. A.</li> <li>6. Geomorphology: Thornburry</li> <li>7. Concepts of Geomorphology: Gupta and Kale</li> </ol>		

## F. Y. B. Sc. Semester-II

F. Y. B. Sc. Semester-II		
GLY-1002	DSC 3- Petrology	Credits:02 Hours:30
<b>Course Outcomes (COs)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
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

Unit	Topic	Number of hours
I	<p><b>A) Introduction to Petrology</b></p> <ul style="list-style-type: none"> <li>➤ Definition of petrology, lithology, petrography, petrogenesis</li> <li>➤ Types of rocks- igneous, sedimentary and metamorphic</li> <li>➤ Diagnostic characteristic of rocks</li> <li>➤ Rock cycle</li> </ul> <p><b>B) Igneous Petrology</b></p> <ul style="list-style-type: none"> <li>➤ Magma and lava, composition, physico-chemical constitution of magma, Bowen's reaction series and formation of crystals and glass</li> <li>➤ Forms of Igneous bodies: <ul style="list-style-type: none"> <li>• Central and fissure type of eruptions</li> <li>• Intrusive: Concordant-sill, Discordant- dyke and batholith</li> <li>• Extrusive: Lava flows</li> </ul> </li> <li>➤ Textures and Structures <ul style="list-style-type: none"> <li>• Textures: Definition and factors controlling igneous textures</li> <li>• Study of following textures: granitic, graphic, porphyritic, poikilitic, directive, glassy</li> <li>• Structures: Vesicular, amygdaloidal, ropy, blocky, pillow, flow, columnar</li> </ul> </li> <li>➤ Tabular classification of igneous rocks on the basis of depth of formation, silica percentage, type of feldspar content and colour index</li> </ul>	15
II	<p><b>A) Sedimentary Petrology</b></p> <ul style="list-style-type: none"> <li>➤ Sediments and derivation of sediments</li> <li>➤ Source of sediments, mineral composition of clastic/detrital sediments</li> <li>➤ Transportation and deposition of sediments- modes of transportation and progressive changes in sediments during transport, Introduction to depositional environment</li> <li>➤ Textures and structures <ul style="list-style-type: none"> <li>• Textures- clastic and non-clastic, concept of matrix and cement</li> </ul> </li> </ul>	15

- Primary sedimentary structures- lamination, bedding, cross bedding, graded bedding, ripple marks and mud cracks
- Chemical structures - stylolites
- Biogenic structures - stromatolites, tracks and trails, burrows
- Classification of sedimentary rocks

**B) Metamorphic Petrology**

- Definition of metamorphism,
- Agents of metamorphism
- Metamorphic minerals- Stress and antistress minerals
- Types of metamorphism- cataclastic, thermal, regional
- Metamorphism and metamorphic products-
- Cataclastic- crush breccias, cataclasite, mylonite
- Thermal metamorphism- quartzite, marble
- Regional metamorphism- slate, phyllite, schist and gneiss
- Structures in metamorphic rocks

**References:**

1. Ernest Ehlers, Harvey Blatt, Petrology: Igneous, Sedimentary and Metamorphic, 1999, CBS Publishers
2. J. D. Winter, Principles of Igneous and Metamorphic Petrology, 2015, Pearson Publishers
3. Tyrrell, G.W., The Principles of Petrology: An Introduction to the Science of Rocks, 1949, Methurn Publisher
4. Dexter Perkins, 1998, Mineralogy, 3<sup>rd</sup> Edition, Pearson Education
5. Kevin Hefferan and John O'Brien, 2010 Earth Materials, A John Wiley & Sons, Ltd., Publication
6. S. M. Sengupta, Introduction to Sedimentology, 2018, 2<sup>nd</sup> Edition, CBS Publishers

## F. Y. B. Sc. Semester-II

F. Y. B. Sc. Semester-II		
<b>GLY-1012</b>	<b>DSC 4- Geology Practical -2</b>	<b>Credits:02 Hours:60</b>
<b>Course Outcomes (COs)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
CO1	Identify different textures and structures in rocks.	1
CO2	Classify various rocks using megascopic and microscopic properties.	2
CO3	Examine different rocks in hand specimens.	3
CO4	Distinguish different optical properties in minerals under microscope.	4
CO5	Determine different minerals in micro-sections.	5
CO6	Write a report on different rocks, minerals and topographic features observed during the study tour.	6

Expt. No.	Title of Experiment
1	Study of optical properties of Minerals-I
2	Study of optical properties of Minerals-II
3	Microscopic study of minerals
4	Study of textures and structures in igneous rocks
5	Study of megascopic igneous rocks
6	Study of megascopic sedimentary rocks
7	Study of primary sedimentary structures
8	Study of megascopic metamorphic rocks
9	Preparation of litholog
10	Study of topographic maps and toposheets
11	Activity- study of igneous rocks from Deccan Traps
12	

<b>F. Y. B. Sc. Semester-II</b>		
<b>GLY-1022</b>	<b>Open Elective-2- World of Minerals and Gemstones</b>	<b>Credits:02 Hours:30</b>
<b>Course Outcomes (Cos)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
CO1	Describe importance of minerals and their formation.	1
CO2	Compare minerals based on physical and optical properties.	2
CO3	Apply the understanding of physical and optical properties for identifying minerals.	3
CO4	Explain applications and economic importance of various minerals.	4
CO5	Compare gemstones on the basis of the different properties.	5
CO6	Prepare a write-up describing properties of minerals and gemstones.	6

<b>Unit</b>	<b>Topic</b>	<b>Number of hours</b>
I	<b>Introduction to Minerals and Uses of Minerals</b> <ul style="list-style-type: none"> <li>➤ Importance of Minerals</li> <li>➤ Definition of Mineral</li> <li>➤ Branches of mineralogy</li> <li>➤ Formation processes of minerals <ul style="list-style-type: none"> <li>• Crystallization from melt</li> <li>• Crystallization from Solution</li> <li>• Crystallization from Vapour</li> <li>• Metamorphic processes</li> </ul> </li> <li>➤ Minerals and Mineral Varieties</li> <li>➤ Uses of minerals in everyday life</li> </ul>	15
II	<b>A) Properties of Minerals</b> <ul style="list-style-type: none"> <li>➤ Physical properties of minerals: Colour, streak, lustre, form, cleavage, fracture, hardness <ul style="list-style-type: none"> <li>• Properties based on magnetism, electrical properties and radioactivity, luminescence</li> <li>• Introduction to optical properties: – Colour, form, cleavage, cracks, pleochroism, isotropism and anisotropism, DR Colours</li> </ul> </li> </ul> <b>B) Introduction to gemstones</b> <ul style="list-style-type: none"> <li>➤ Introduction and History of Gemmology</li> <li>➤ Attributes of Gemstones</li> <li>➤ Physical and Optical characteristics of gemstones</li> <li>➤ Introduction to the instruments used for gem identification</li> <li>➤ Study of gemstones from their salient features from different mineral groups</li> <li>➤ Introduction to Diamonds</li> </ul>	15

References:

1. Dexter Perkins, 1998, Mineralogy, 3<sup>rd</sup> Edition, Pearson Education
2. Kevin Hefferan and John O'Brien, 2010, Earth Materials, A John Wiley & Sons, Ltd., Publication
3. Gribble, C. D., 1988, Rutley's Elements of Mineralogy, 27th Edition, Unwin Hyman, London
4. K. M. Bangar, 2015, Principles of Engineering Geology, 2<sup>nd</sup> Edition, Standard Publishers Distributors
5. Anderson B.W., 2011, Gem Testing, Read books Ltd.
6. Read, P.G., 2005, Gemmology, Elsevier / Butterworth - Heinemann

## F. Y. B. Sc. Semester-II

<b>GLY-1032</b>	<b>SEC 1- Earth System Science</b>	<b>Credits:02 Hours:30</b>
<b>Course Outcomes (COs)</b> <b>On completion of the course, the students will be able to:</b>		<b>Bloom's cognitive level</b>
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 of 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

Unit No.	Title of Unit and Contents	No. of Hours
<b>I</b>	<p style="text-align: center;"><b>EARTH: ITS ORIGIN, AGE, INTERIOR AND PROCESSES</b></p> <p><b>Introduction:</b> Definition of geology, its divisions, sub-divisions and scope  <b>Planet Earth-</b> Origin of the Universe, Origin of the Solar System  <b>Earth:</b> Its size, shape and density. Temperature, pressure and magnetism within the earth, Present day hypsographic curve  <b>Age of the Earth:</b> A brief account of the historical methods.                      a) Determination of age by the K/Ar, U/Th and Carbon dating methods                      b) Geological Time Scale: Concept and Criteria.  <b>The Earth's Atmosphere, Hydrosphere, Lithosphere and Biosphere</b>  <b>Interior of the Earth</b></p>	<b>15</b>



<p><b>II</b></p>	<p style="text-align: center;"><b>DYNAMICS OF THE EARTH</b></p> <p><b>Plate Tectonics-</b> Historical Overview, Different types of plate movements with their salient characters, Various plates of the world and their movements</p> <p><b>Volcanoes:</b> Genesis of volcanoes, Central and fissure type of eruptions. Products of volcanoes, effects of volcanoes, earth's volcanic belts.</p> <p><b>Earthquakes:</b> Definition, terminology, causes, intensity and magnitude. Recording of earthquakes (Modern recording method). Use of seismic waves and their importance in interpreting the earth's internal structure. Seismic zones. History and susceptibility of the Indian subcontinent to earthquakes.</p> <p><b>Types of Mountains:</b> Fold, fault block, volcanic and residual.</p> <p><b>Geomorphic processes and landforms-</b></p> <p>Weathering, erosion and denudation</p> <p><b>Types of weathering:</b> Mechanical and Chemical</p> <p>Study of various erosional and depositional landforms resulting from the action of: River, Wind, Sea and Glaciers</p>	<p style="text-align: center;"><b>15</b></p>
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>8. General Geology: Radhakrishnan</li> <li>9. Holmes' Principles of Physical Geology: Edited by P. McL. D. Duff</li> <li>10. Plate tectonics and Crustal evolution: Condie</li> <li>11. Our evolving planet : Bergen, Alma Mater Fortag</li> <li>12. Geomorphology and Global Tectonics: Summerfield M. A.</li> <li>13. Geomorphology: Thornburry</li> <li>14. Concepts of Geomorphology: Gupta and Kale</li> <li>15. The Dynamic Earth System: Prof. Patwardhan</li> </ol>		