

B.Sc. Geology Ist Semester

Code of the course	GEO5000T
Title of the course	Geology-I: Earth System Science (ESS)
Level of the course	NHEQF Level 4.5
Credit for the course	4
Type of the course	Discipline Centric Core Course
Delivery type of the course	Theory
Objectives of the Course	<ul style="list-style-type: none"> • This course aims to develop a holistic understanding of the planet Earth and its physical process. • It will also help the student in understanding the processes responsible for the formation of various landforms. • The course will impart a fundamental understanding of hydrogeology and structural geology.
Syllabus	
<u>Geology-1 Earth System Science</u>	
Unit 1 Introduction to Earth as Planet	
Holistic understanding of Earth as a dynamic planet. Introduction to various branches of Geology. General characteristics and origin of the Universe, Solar System, and its planets. The terrestrial and jovian planets. Meteorites and Asteroids. Earth in the solar system - origin, size, shape, mass, density, rotational and revolution parameters, and its age. Geological Time Scale.	
Unit 2 Interior and Exterior of Earth's Surface	
Formation of core, mantle, crust, hydrosphere, atmosphere, and biosphere Convection in Earth's core and production of its magnetic field. The mechanical layering of the Earth. Concept of Plate Tectonics, Sea-Floor Spreading, and Continental Drift. Geodynamic elements of Earth- Mid Oceanic Ridges, trenches, transform faults, and island arcs. Origin of oceans, continents, mountains, and rift valleys. Earthquake and earthquake belts. Volcanoes- types, products, and their distribution. Introduction to Geomorphology. Endogenic and Exogenic processes. Weathering and associated landforms and Hill slopes, Glacial, Periglacial processes and landforms, Fluvial processes and landforms, Aeolian Processes and landforms, and Coastal Processes and landforms.	
Unit 3 Fundamentals of Structural Geology and Hydrogeology	
Fundamentals of Structural Geology: Concept of strike and dip. Description and applications of clinometer compass. Primary sedimentary structures: Types of Bedding. Igneous structures. Metamorphic structures: Foliation, Cleavages. Definition and Classification of Fold, Fault, Joint, Lineations, and Unconformity. Description of Stress, Strain, Outliers, Inliers, Overlap and Offlap Definition of hydrogeology, Hydrological cycle; Hydrological parameters - Precipitation, evaporation, transpiration, and infiltration. Origin of groundwater; Vertical distribution of groundwater, Types of aquifers; Water bearing properties of rocks - Porosity and Permeability; specific yield, specific retention. Groundwater provinces of India. Groundwater quality.	
Books suggested for reading:	

Handwritten signatures and initials:

- Holmes, Arthur., 1992, Principles of Physical Geology, Chapman and Hall, London.
- Miller., 1949, An Introduction to Physical Geology, East West Press Ltd.
- Spencer, E.V., 1962, Basic concepts of Physical Geology. Oxford & IBH.
- Mahapatra, G.B., 1994, A textbook of Physical Geology, CBS Publishers.
- Press and Siever 1998, Understanding Earth, WH Freeman & Co.
- Emiliani, C., 1992, Planet Earth: cosmology, geology, and the evolution of life and environment. Cambridge University Press.

Suggested E-resources:

- <https://serc.carleton.edu/geo2yc/courses/46478.html>
- <https://ocw.mit.edu/courses/12-001-introduction-to-geology-fall-2013/pages/lecture-notes-and-slides/>
- https://youtube.com/playlist?list=PL0kOtHcPhFRW64YWNXF3H_whgAXGZR4zK
- <https://www.youtube.com/@EarthandSpaceSciencesX>
- <https://youtu.be/fiMemypKqEI>
- <https://youtu.be/5ieigKiklRY>
- https://youtu.be/3JZb1e_Su3g

Course learning outcomes:

- Students are expected to learn about the dynamic planet Earth and the processes responsible for it.
- Students will be understanding the exogenic and endogenic processes responsible for the earth's landscape.
- Students will also appreciate the role of rock parameters in the field of hydrogeology and structural geology.

Handwritten signatures: Handwritten signature *Handwritten signature* *Handwritten signature*

Code of the course	GEO5000P	
Title of the course	Geology Lab-I: Earth System Science (ESS)	
Level of the course	NIEQF Level 4.5	
Credit for the course	2	
Type of the course	Discipline Centric Core Course	
Delivery type of the course	Practical	
Objectives of the Course	<ul style="list-style-type: none"> The practical exercise aims to develop an understanding of the earth's landscape and tectonic features. 	
Syllabus	<p align="center">Geology Lab-I: Earth System Science (ESS)</p> <ul style="list-style-type: none"> Draw the Physical divisions of India and Rajasthan on respective maps. Draw the distribution of earthquakes and major mountains on the map of the world and India. Geological Time Scale Earth internal structure Draw landforms of rivers, wind, glaciers, and volcanoes. Study of physical models showing geomorphic features. Configuration and Numbering of topographic maps on various scales. Interpretation of various geomorphic landforms and drainage patterns on toposheet. Map exercise related to the plotting of major mountain ranges, lakes, and rivers of India & seismic data on the map of India. Measurement of strike and dip Identification of structural features in hand specimens 	
Books suggested for reading:	<ul style="list-style-type: none"> Holmes, Arthur., 1992; Principles of Physical Geology, Chapman and Hall, London. Miller., 1949, An Introduction to Physical Geology, East West Press Ltd. Spencer, E.V., 1962, Basic concepts of Physical Geology. Oxford & IBH. Mahapatra, G.B., 1994, A textbook of Physical Geology, CBS Publishers. Press and Siever 1998, Understanding Earth, WH Freeman & Co. Emiliani, C., 1992, Planet Earth: cosmology, geology, and the evolution of life and environment. Cambridge University Press. 	
Suggested E-resources:	<ul style="list-style-type: none"> https://serc.carleton.edu/geo2yc/courses/46478.html https://ocw.mit.edu/courses/12-001-introduction-to-geology-fall-2013/pages/lecture-notes-and-slides/ https://youtube.com/playlist?list=PL0kOtHcPhFRW64YWNXf3H_whgAXGZR4zK https://www.youtube.com/@EarthandSpaceSciencesX https://youtu.be/fiMemypKqEl https://youtu.be/5icigKiklRY https://youtu.be/3JZb1e_Su3g 	
Course learning outcomes:	<ul style="list-style-type: none"> Students will be able to identify various landforms and structural features and understand the mechanism responsible for them. 	
EOSE (Practical):	80 Marks	
Practical - 45 Marks		

Viva – Voce - 15 Marks	
Record - 20 Marks	
Internal Exam - i. Exam – 10 Marks ii. Assignment/ Seminar/Quiz – 10 Marks	20 Marks

  