

Course Type	Course Code	Name of the Course	L	T	P	Credits
DSC	NGLC101	Earth System and Processes	3	0	0	3

Course Objective
Introduce the student to Earth as a system and the various processes that continue to shape the planet as a whole.
Learning Outcomes
<ol style="list-style-type: none"> 1. Understand the Earth as a system in different scales 2. Understand fundamental concepts and principles that govern Earth system processes 3. Understand the interactions between the processes and their impact on the planet

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Earth as a system; origin of the universe; formation of the Solar System; the position of the Earth in the Solar System; age of the Earth; the different 'spheres' of the Earth – geosphere, hydrosphere, atmosphere, cryosphere and biosphere	7	Learn about the origin theory of the Earth, its star and the other planetary bodies
2.	Composition and the internal structure of the Earth; Earth's internal heat; Earth materials – mineral and rock types; rock cycle; continental drift; plate tectonics; dynamics of the interior of the Earth	7	Learn about the interior and the dynamics of the Earth
3.	Geologic structures; topography; hydrologic cycle; glaciers; oceans; the sedimentary cycle; weathering and erosion; landforms; volcanism	7	Learn about the different structures and landforms of the Earth
4.	Earth's biosphere; biogeochemical cycle; the geologic time scale; Earth's fossil record; origin of life; search for extraterrestrial life	7	Learn about the Earth's biosphere
5.	Natural hazards; seismicity; earthquakes and tsunamis; atmospheric circulation; ocean circulation; ocean currents; El Niño and La Niña patterns	7	Learn about the natural hazards and their causes
6.	Earth's climate – past, present and future; Earth's heat budget; climate change; sea level change; Milankovitch cycles; greenhouse effect; global warming; anthropogenic causes; energy transition; renewable resources	7	Learn about the reality of climate change and the need for energy transition

Text Books:

1. Hefferan, K. and O'Brien, J., 2010. Earth Materials, *Wiley-Blackwell*, Sussex, 670 p.
2. Jacobson, M., Charleson, R.J., Rodhe, H. and Orians, G.H., 2000. Earth System Science: from biogeochemical cycles to global changes, *Academic Press*, 548 p.

Reference Books:

1. Jain, S., 2014. Fundamentals of Physical Geology, *Springer*, New Delhi, 494 p.
2. Kenneth, W. and Christiansen, E.H., 2004. Earth's Dynamic Systems, *Prentice Hall*, 759 p.
3. Davidson, J.P., Reed, W.E. and Davis, P.M., 1997. Exploring Earth: An Introduction to Physical Geology, *Prentice Hall*, 477 p.
4. Lowrie, W., 2007. Fundamentals of Geophysics, *Cambridge University Press*, 381 p.