

Course title: Environmental Geosciences				
Course code: NRE 139		No. of credits: 3	L-T-P: 38-4-6	Learning hours: 45
Pre-requisite course code and title (if any):				
Department: Natural and Applied Sciences				
Course coordinator: Dr Amit Singh		Course instructor: Dr Amit Singh		
Contact details: amit.singh@terisas.ac.in				
Course type: Core		Course offered in: Semester 1		
Course Description				
<p>The earth is facing several developmental challenges such as environmental pollution, depletion of natural resources and global climate change. All these challenges are intrinsically linked with the various components of the Earth's systems and its processes. Thus for addressing the various global developmental challenges, knowledge on the Earth's physical functioning and its inter-linkages with the various developmental aspects is essential.</p> <p>This course aims to provide the students with the fundamental scientific understanding of the Earth's components and the various environmental processes that controls its functioning.</p> <p>The course will also introduce the students on how development and various anthropogenic activities affect the Earth's environment.</p> <p>The course will provide the necessary knowledge and skillsets to the students for studying how the Earth's environment and climate have changed over time under natural as well as anthropogenic influences.</p>				
Course objectives				
<ul style="list-style-type: none"> • The course will introduce students to the fundamental scientific understanding of the Earth's components and its drivers. • To apply the theoretical knowledge of the Earth's functioning in understanding real life environmental challenges. 				
Course content				
Module	Topic	L	T	P
1	Introduction Earth's systems sciences	2		
2	Earth and the Environment			
	Dynamics and Structure of Earth - Earth's interior; Mineralogy and Geomorphology, Rock (formation and types), Sedimentology, Plate tectonics, orogenesis	10		
	Environmental Geology- Paleo-environment, Hydrogeology, Aquifers, mineral deposits, Quaternary Geology and Anthropocene	6		
	Understanding natural disasters- earthquakes, volcanoes, cyclones, landslides, floods, drought, tsunamis	6		
3	Biogeochemical cycles	4		
4	Natural Resources and Contemporary Environmental Problems			
	Water	2		
	Energy	2		
	Waste	2		
	Biogeography	2		
	Land resources and land use; Land Degradation Neutrality	2		
5	Field Methods in Environmental Geoscience Students will conduct guided field-based assignments through the semester on any one environmental issue. They will also learn to apply various environmental tools in understanding these challenges.		4	6
		38	4	6
Evaluation criteria				
<ul style="list-style-type: none"> • Minor Test 1: 20% • Minor Test 2: 20% • Major Test: 40% • Assignment: 20% 				

Learning outcomes

Upon completion of this course, the students will be able to:

- Demonstrate knowledge of fundamental geological processes (Test 1)
- Identify contemporary environmental problems and their drivers including anthropogenic activities. (Test 2)
- Apply geosciences knowledge in solving environmental issues (Test 3)
- Able to systematically apply the knowledge on earth's system in analyzing environmental issues. (Assignment)

Pedagogical approach

A mix of theory, classroom discussion, case studies and field studies

Materials**Textbooks**

- Keller, E. A. (2012). Introduction to environmental geology. Upper Saddle River, NJ, Prentice Hall.
- Skinner, B. J., and Porter, S. C. 1995. The Blue Planet, An Introduction to Earth System Science, John Wiley & Sons, Inc.
- Carla Montgomery (2019) Environmental Geology (11th Edition) McGraw-Hill
- Valdiya KS, 2013. Environmental Geology, Tata McGraw-Hill Education
- Valdiya KS, 2004. Coping with Natural Hazards: Indian Context, Orient Longmann

Suggested readings

- Strahler and Strahler (2010), *Modern Physical Geography*, John Wiley & Sons, Inc.
- Mukherjee, S. (2006). Earthquake Prediction. Published by Brill Academic Publishers Koninklijke Brill NV, Leiden (The Netherlands) & Boston (USA). ISBN-10: 90 6764 450 1 and ISBN-13 (i) 978 9067644 50
- Bryant R.H. (1990) Physical Geography: Made Simple, New Delhi, Rupa Publications.
- Chorley R.J. (1969) Water, Earth and Man: A Synthesis of Hydrology, Geomorphology and Socio-economic Geography, London: Methuen Young Books.

Journals

- Geoscience Frontiers
- Geoscience Journal
- Nature Geoscience
- Environmental Pollution
- Atmospheric Environment
- Science of the Total Environment
- Science

Relevant and updated research articles will be shared with the students during the course.

Additional information (if any)**Student responsibilities**

Students are expected: to read the background material and come for the lecture, to be interactive in the class discussions

Course Reviewers:

- Prof. Saumitra Mukherjee, Former Dean, School of Environmental Sciences, Jawaharlal Nehru University
- Dr Pawan Kumar Jha, Centre for Environmental Sciences, University of Allahabad.