

Environmental Geoscience

1.1. Course Number: GE415

1.2. Contact Hours: 2-0-0 Credits: 6

1.3. Semester Offered: 4th Year-Even

1.4. Prerequisite: Basic knowledge of Geology, Physics and Chemistry

1.5. Syllabus Committee Members: Dr. Alok Kumar Singh & Dr. Hemant Kumar Singh

2. Objective: To provide the student with the tools necessary to interpret change in global environments and encourage critical thinking & effective problem-solving methodologies for sustainability in human-landscape interactions.

3. Course Content: Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topics	Lectures
1	Definition, scope, concepts, forms of environment	Fundamental concepts of Environmental Geology/Environmental geoscience—its scope, objectives, and aims. Environmental Awareness - Role of Geologist in Environmental Protection and Planning. Earth's thermal environment and Climates. Global warming. Green-house effect. Ozone depletion—Ice sheets and fluctuation in sea levels. Concepts of ecosystem. Earth's major ecosystems terrestrial and aquatic	9
2	Environmental pollution (Man-made)	Earth resources – Air, water, soil, and vegetation. Pollution of natural resources. National and International standards. Constructions and urbanization. Waste disposal – Environmental effects – Waste recycling – recycling of resources. Application of remote sensing in detecting Land Cover, Environment pollution due to Mining: opencast, underground, solid waste generation, dumping stacking, rehandling, management, mineral processing, tailing ponds, acid mine drainage, siltation, case studies. Noise levels - national standards. Fundamental concepts of geological hazards and crisis management. Environmental considerations in location and construction of large-scale structural features.	12
3	Natural Pollution	Study of surface geological processes, earthquakes, volcanism, floods, and landslides with reference to their impact on environment. Soils, erosion, and conservation. Beach erosion – sedimentation – coastal zone protection & Management – coastal engineering constructions – their	9

		effects remedial measures, Geological solutions to environmental, problems. Role of geology in waste disposal, Global warming, Climate change and Mitigation.	
			Total
			30

4. Readings:

4.1. Textbook:

- Valdia, K. S. (1987): Environmental Geology, Tata McGraw hills, New Delhi
- Keller, A. E. (1978): Environmental Geology (5th Edt.) Charis and Merrill Pub. Co.
- Montgomery, C. W. (2016): Environmental Geology, Mc Graw Hall Global Education Holding publishers

4.2. Reference Books:

- Tonk, W. R. (1986): Environmental Geology, Oxford University Press, New York 1983
- James S. Reichard (2017) Environmental Geology, 3rd Edition, Blackwell Publication.

5. Outcome of the course:

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

- Describe common earth materials and their relationship to environmental hazards; and explain how earth processes create hazards to life and property
- Describe the occurrence and formation of earth resources and significant environmental effects caused by their extraction, processing, and use.
- Describe the major sources of water, soil, and sediment pollution and methods for their management and explain the causes and effects of global climate change.