CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE-7 **Environmental Geology**	**4**	**3**	**0**	**1**	**12th pass with science**	**Studied Earth System Science and Structural Geology, Hydrogeology or Equivalent**

Learning Objectives :

The course aims to:

- Equip students with an understanding of the interactions between geologic processes, ecological processes, and society.
- Emphasize that the future standard of life and quality of living will be influenced by how Earth's resources are utilized.
- Introduce the concept of environmental geology as the application of geologic information to understand and manage the interactions between people and the physical environment.

Learning Outcomes :

Upon completing the course, students will be able to:

- Understand the basic concepts and principles of physical and environmental geology, with a focus on Earth materials and processes.
- Gain knowledge about natural hazards and their relation to the geologic environment.
- Develop a clear understanding of the relationship between natural resources and pollution.
- Attain a systematic understanding of environmental management concepts as they relate to geology, in areas such as: Waste management, Environmental health, Global change, and Environmental assessment.

THEORY **(45 Hours)**

UNIT – 1: **(12 hours)**

Concept and definition of Environmental Geology. Components of Earth System and their mutual inter-relations and interactions (atmosphere, hydrosphere, lithosphere and biosphere).

Concept of biodiversity

UNIT – 2: **(13 hours)**

Earth Processes and Natural Hazards: Distribution, magnitude and intensity of earthquakes. Neotectonics and seismic hazard assessment. Seismic hazard maps. Impact of seismic hazards on long and short term environmental conditions. Mechanism of landslides, causes of major floods, Coastal hazards, cyclones and storms

UNIT – 3: **(10 hours)**

Resources and Pollution: Soil degradation and changing land use pattern. Soil contamination due to urbanization, industrialization and mining. Water pollution: Impact assessment of water availability, quality and contamination of surface water and groundwater. Major Water Pollutants, Surface-Water Pollution and Treatment, Groundwater Pollution and Treatment , Water-Quality Standards, Wastewater Treatment, Air pollution: Introduction to Air Pollution, Pollution of the Atmosphere, Sources of Air Pollution, Air Pollutants, Urban Air Pollution, Indoor Air Pollution, Control of Air Pollution, Air Quality Standards, Deforestation

UNIT – 4: **(10 hours)**

Environmental management: Global Climatic Change, Anthropogenic influence on environment, Basic tenets of environmental laws. Environmental Protocols. Environmental Planning: Site Selection Environmental Impact Analysis and Use and Planning

PRACTICALS **(30 hours)**

Study of maps of seismic zones, earthquake-prone, landslide-prone and flood-prone areas in India. Methods of water analyses for physical, chemical and biological parameters.

Classification of groundwater for use in drinking and industrial purposes. Evaluation of environmental impact of air pollution, groundwater pollution, landslides, deforestation.

Essential Readings:

- Valdiya, K.S., 2013. Environmental Geology – Ecology, Resource and Hazard Management, 2nd Edition, McGraw Hill (Education) Pvt. Ltd. India.
- Richards J.S., 2013. Environmental Geology. 2nd Edition, McGraw-Hill Science Engineering
- Smith, K., 2013. Environmental Hazards. Assessing Risk ang Reducing Disaster, 6th Edition, Routledge, London.
- Subramaniam, V., 2001. Textbook in Environmental Science, Narosa International
- Kellar, E. A. 2017. Introduction to Environmental Geology. 5th Edition, Pearson

Recommended Readings:

- Botkin, D,B. and Keller, E. A. Environmental Science: Earth as a Living Planet, 9th Edition, Wiley.
- Merritts, D., de Wet, A. and Menking, K. 1998. Environmental Geology: an earth system science approach. W.H. Freeman & Co., N. Y.
- Keller, E.A, DeVecchio, D.E and Blodgett, R.H., 2019. Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes 5th Edition, Routledge, London.