Syllabus for Interdisciplinary Course (IDC)

in Environmental Science

ENV-IDC-Th: Environmental Science

(Theory 50 + Practical 25)

Total Credits: 3 (2TH+ 1P)

Unit 1: Understanding the Environment **(5 Lectures)**

Concept of environment and its Transdisciplinary approach, perspectives of environmentalism, Environmental ethics, Man-environment relationships, Environment-society interface, conflict between environment and development. Concept of carrying capacity, resilience and ecological footprints. Carbon footprint and low carbon economy.

Unit 2: Environmental systems **(5 Lectures)**

Concept of atmosphere, lithosphere, hydrosphere and biosphere and their interactions. Importance of biogeochemical cycles (Carbon, Nitrogen, Sulphur, Phosphorous), Global heat budget, basics of climate and weather, meteorological parameters, climatic zones of the world Basics concept of renewable energy resources, introduction to biogeographical realms.

Unit 3: Environmental vulnerability **(8 Lectures)**

Environmental degradation: qualitative and quantitative. Air, water and soil pollution source, impacts and remedial measures.

Concept of Municipal solid waste and hazardous waste, 5Rs of waste management, basic concept of circular economy.

Biodiversity loss: extent of loss, natural and anthropogenic causes and impact of biodiversity loss on ecology and economy.

Climate change: past and present scenario of climate change. drivers of climate change. impact of climate change on seal level rise, biodiversity, agriculture, disease prevalence, food security, migration and demographic changes.

Unit 4: Environmental Health **(5 Lectures)**

Concept of Environmental health: definition and components. Environmental risk factors Water borne diseases: Cholera and Diarrhoeal diseases. Vector borne diseases: Dengue and Malaria. Occupational health and Health consequences of different occupations- Silicosis, Asbestosis. Basics of Xenobiotics.

Unit 5: Sustainable development **(6 Lectures)**

Concepts of sustainability. Genesis of Sustainable Development – Brundtland's commission. Rio declaration – Agenda 21. Sustainable Development Goals (SDG). Sustainability development index, Sustainability in the context of energy use,

agriculture, industry and urbanization. Watershed management and sustainable land use. Concept of sustainable agriculture.

Unit 6: Disaster Management: (5 Lectures)

Types of disasters, disaster prediction and prevention, pre and post disaster management. Disaster Management cycle. Case studies of natural disasters – Cyclone *'Phailin'*, Cyclone '*Amphun'*, Kerala floods and anthropogenic disasters- Bhopal gas tragedy, Chernobyl disaster. Disaster management Act (2005) of India.

Unit 7: Tools for addressing environmental challenges (8 Lectures)

Monitoring and abatement technology for air pollution (monitoring of gaseous and particulates pollutants and abatement technologies – bag filter, scrubber, ESP, cyclone precipitator) water pollution (monitoring of DO, BOD, COD, coliform and primary treatment, secondary treatment, tertiary treatment technologies); Soil pollution abatement through bioremediation.

Environmental application of Remote sensing and GIS.

Valuation of environmental services: Stated preference and revealed preference methods (CVM, TCM, Hedonic pricing).

Unit 8:Environmental Management tools for Sustainable development:(8 Lectures)

Global and National Initiatives: Convention on Biological Diversity, 1992; Kyoto Protocol, 1997, Montreal Protocol, 1987; Basel convention, 1989, Copenhagen, 2009, Rio+20, 2012; Paris Accord, 2015. Environmental Management System and ISO 14001, Ecolabelling and Ecomark, Basics of Environmental Impact Assessment, Life Cycle Assessment. Clean Development Mechanism: Carbon trading and Polluters Pay principle.

ENV-IDC-Pr: PRACTICAL:

1. Measurement of meteorological parameters: Relative humidity, Rainfall, Atmospheric pressure, Wind speed. **10**
2. Biodiversity documentation and its quantification (Frequency, Density, Shannon weiner and Simpson's index of diversity) in local area and report submission. **10**
3. Submission of assignment on any case study of any sustainable environmental management (land, energy, agriculture, water, industrial pollution etc.) **5**

Suggested Readings:

1. Masters, G.M., and Ela W,P., 2008. *Introduction to Environmental Engineering and Science (3rd Ed.).*Pearson.
2. Miller, G.T 2012. *Environmental Science*. Wadsworth Publishing Co.
3. Santra, S.C. 2011. Environmental Science (3rd Edition). New Central Book Agency.
4. Sharma P.D 2014 Environmental Biology and Toxicology. Rastogi Publications
5. Shaw R., and Krishnamurthy R.R., 2009. Disaster: Global Challenges and Local Solutions.