

# Teaching Lesson Plan

VAC (2 +2 Credits)

ENVIRONMENTAL STUDIES (2 Credits)

Lecture hours: 30

**OBJECTIVES:** To Appreciate the historical context of human interactions with the environment.

SN	Subject and Objectives	Lectures Hrs	Methodology	Evaluation Mode
<b>Unit-I</b>		<b>2Hrs</b>		
	<ol style="list-style-type: none"> <li>1. The man-environment interaction; Humans as hunter-gatherers; Mastery of fire; Great ancient civilizations and the environment.</li> <li>2. UN Conference on Human Environment 1972; Environmental Ethics and emergence of environmentalism; World Commission on Environment and Development and the concept of sustainability; Indic Knowledge and Culture of sustainability.</li> </ol>	2	PPT, Illustrations	Q & A, Assignments
<b>Unit-II</b>	<b>Ecosystem</b>	<b>4Hrs</b>		
	<ol style="list-style-type: none"> <li>1. Concepts of ecosystem; Structure and function of ecosystem; Food chains, Food webs, Energy flow in an ecosystem.</li> <li>2. Indicator species, keystone species and their role in ecosystem.</li> <li>3. Major ecosystem types in India and their basic characteristics;               <ol style="list-style-type: none"> <li>a. Forest ecosystem</li> <li>b. Grassland ecosystem</li> <li>c. Desert ecosystem</li> <li>d. Aquatic ecosystems (Fresh water &amp; marine water ecosystem) Importance of Wetland, Mangroves, Coral reef.</li> </ol> </li> </ol>	4	PPT, Illustrations	CIA
<b>Unit-III</b>	<b>Natural Resources and Sustainable Development</b>	<b>4Hrs</b>		
	<ol style="list-style-type: none"> <li>1. Overview of natural resources: renewable and non-renewable.</li> <li>2. Water resources; Water scarcity and stress; issues and challenges; Conflicts over water. Water conservation methods; Rain water harvesting, check dams and other traditional methods.</li> <li>3. Mineral resources; important minerals of Jharkhand; Environmental problems due to extraction of minerals.</li> <li>4. Soil as a resource and its degradation; Soil erosion, effects of soil erosion, remedial measures of soil erosion. Desertification;</li> </ol>	4	PPT, Illustrations	Q & A, Assignments

	<p>effects of desertification, remedial measures of Desertification.</p> <p>5. Forest Resources: Importance, deforestation, Afforestation</p> <p>6. Energy resources: Conventional energy sources- coal, oil, natural gas, nuclear energy; non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells.</p> <p>7. Introduction to sustainable development: Sustainable Development Goals (SDGs) - targets and indicators, challenges and strategies for SDGs.</p>			
<b>Unit-IV</b>	<b>Biodiversity and its conservation</b>	<b>5Hrs</b>		
	<p>1. Biodiversity and its distribution: Biodiversity as a natural resource; Levels and types of biodiversity; genetic, species and ecosystem diversity.</p> <p>2. Hot spots of biodiversity; biodiversity hot spots of world; Biodiversity hot spots of India; endemic species; microbes and biodiversity.</p> <p>3. Threats to biodiversity; Habitat loss, poaching of wildlife, man-wildlife conflicts, Invasive species.</p> <p>4. Conservation of biodiversity; In-situ and Ex-situ conservation approaches; Project Tiger; Cheetah reintroduction and translocation program; Major protected areas of Jharkhand. Role of traditional knowledge, Gender and conservation.</p> <p>5. IUCN and its role in biodiversity conservation, endangered species of India.</p> <p>6. Ecosystem and Biodiversity services: Aesthetic, Ethical, Economic, Informational, social value.</p>	5	PPT, Illustrations	Q & A, Assignments
<b>Unit-V</b>	<b>Environmental Pollution and Health</b>	<b>5Hrs</b>		
	<p>1. Definition of pollution; Point sources and non-point sources of pollution; Structure of atmosphere.</p> <p>2. Types of Pollution; Air pollution; Sources of air pollution; Primary and secondary pollutants; Criteria pollutants- carbon monoxide, lead, nitrogen oxides, ground-level ozone, particulate matter and sulphur dioxide.</p> <p>3. National Ambient Air Quality Standards.; Indoor air pollution; Adverse health impacts of air pollutants</p> <p>4. Elementary idea about Ozone layer, Ozone layer depletion and its harmful effects</p>	5	PPT, Illustrations	Q & A, Assignments

	<p>5. Water pollution: Sources of water pollution; marine pollution, Water quality parameters and standards; adverse health impacts of water pollution on human and aquatic life. Plastic pollution, Biomagnifications, Eutrophication.</p> <p>6. Noise pollution: Definition of noise; Unit of measurement of noise pollution; Sources of noise pollution; Noise standards; adverse impacts of noise on human health.</p> <p>7. Thermal and Radioactive pollution and impact on human health.</p>			
<b>Unit-VI</b>	<b>Climate Change: Impacts, Adaptation and Mitigation</b>	<b>10Hrs</b>		
	<p>1. Understanding global warming and climate change: Natural variations in climate; Anthropogenic climate change from greenhouse gas emissions– past, present and future; Projections of global climate change with special reference to temperature, rainfall, climate variability and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming.</p> <p>2. Climate change projections for the Indian sub-continent. Impacts, vulnerability and adaptation to climate change.</p> <p>3. Adaptation vs. resilience; Climate-resilient development; Indigenous knowledge for adaptation to climate change.</p> <p>4. Mitigation of climate change: Synergies between adaptation and mitigation measures; Green House Gas (GHG) reduction vs. sink enhancement; Concept of carbon intensity and carbon neutrality; National and international policy instruments for mitigation, decarbonizing pathways and net zero targets for the future; Carbon capture and storage.</p> <p>5. National climate action plan and Intended Nationally Determined Contributions (INDCs); Mission LiFE, Climate justice.</p>	5	PPT, Illustrations	Q & A, Assignments
<b>Unit-VII</b>	<b>Environmental Management</b>	<b>2Hrs</b>		
	<p>1. Introduction to environmental laws and regulation: Constitutional provisions- Article 48A, Article 51A (g) and other derived environmental rights.</p> <p>2. Environmental management system: ISO 14001 (elementary).</p> <p>3. Waste Management- Concept of 3R (Reduce, Recycle and Reuse), Ecolabeling/Ecomark scheme.</p>	2	PPT, Illustrations	Q & A, Assignments
<b>Unit-VIII</b>	<b>Environmental Treaties and Legislation</b>	<b>3Hrs</b>		

	<ol style="list-style-type: none"> <li>1. An overview of major International Environmental Agreements and India's status as a party</li> <li>2. Kyoto Protocol; Paris Agreement; Intergovernmental Panel on Climate Change (IPCC), ISA- International Solar Alliance.</li> <li>3. Convention on Biological Diversity (CBD); Nagoya Protocol on Access and Benefit-sharing.</li> <li>4. United Nations Convention to Combat Desertification (UNCCD).</li> <li>5. Montreal Protocol on Substances that Deplete the Ozone Layer and the Kigali Amendment; Status phase out of production and consumption of Ozone Depleting Substances by India.</li> <li>6. Major Indian Environmental Legislations; The Wild Life (Protection) Act, 1972; The Environment (Protection) Act, 1986; The Biological Diversity Act, 2002; The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.</li> <li>7. The Pollution Control Act, 1989 and updates.</li> <li>8. National Green Tribunal; Some landmark Supreme Court judgments.</li> </ol>	3		
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#### Reference Books:

1. A text book of Environmental Studies- E. Bharucha (English/ Hindi)
2. Fundamental Concepts in Environmental sciences DD Mishra- Sultan Chand publication
3. Fundamental of ecology; by MC Dash
4. A textbook of environmental studies; C. Rajgopalan
5. Comprehensive environmental studies- Laxmi publication
6. Environmental studies: Asthann
7. A text book of environmental studies: SVS Rana
8. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt. 2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. Of California Press.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia
10. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP
11. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi
12. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press.
13. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent
14. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press

Prepared by: Department