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**NIRMA UNIVERSITY**

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	Bachelor of Science (Computer Science and Engineering) [2+2 Dual Degree]
<b>Faculty:</b>	Faculty of Technology & Engineering
<b>Course Code:</b>	<b>1CL502</b>
<b>Course Title:</b>	Environmental Science
<b>Course Type:</b>	Common
<b>Year of introduction:</b>	2023-24

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**Course Learning Outcomes (CLOs):**

At the end of the course, the student will be able to –

1. demonstrate principles of conservation of environment and energy resources
2. summarize environmental pollutions and control techniques
3. illustrate concepts of sustainability and environmental impact assessment
4. identify possible solutions regarding social issues related to the environment.

**Syllabus:**

**Total Teaching hours:45**

Unit	Syllabus	Teaching hours
<b>Unit-I</b>	<b>Multidisciplinary Nature of Environment:</b> Introduction to environment and multidisciplinary nature of environment, energy and environment, Energy resources- Present energy resources in India, energy demand scenario in India, growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Environment conservation and management, Bio-diversity and its conservation, Atmospheric chemistry and ozone depletion, Greenhouse effect and its causes, Climate change: causes, effects, challenges, and remedial measures, Relationship between development and disasters, case studies of global disasters and effect on environment.	12
<b>Unit-II</b>	<b>Environmental Pollution:</b> Introduction of environmental pollution, various pollution parameters, Types of environmental pollution and pollutants. Causes, effects, and control measures of – Air pollution, Water pollution, Air Quality Index and Global ranking of cities based on AQI, Eutrophication, Waste management: Solid, Plastic, E-waste, Construction & Demolition, 5 R's concept of waste management (refuse, reduce, reuse, repurpose, and recycle), Soil/land pollution, Noise pollution, Radioactive pollution, and Thermal pollution, Environment Performance indices, Role of an individual in prevention of pollution, case studies of air and water pollution, Techniques for material recovery from polluted products.	13

11  
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<b>Unit-III Sustainability and Environmental Impact Assessment:</b>	10
Concept of Sustainability and importance of sustainable development, introduction to sustainable development goals, case studies of sustainable designs/products/material/projects. Concept of Environmental management systems. Introduction to green technologies; Environmental impact assessment (EIA): process, Case studies; Life cycle assessment (LCA): Introduction, process, Technoeconomic analysis; carbon credit and carbon footprint.	
<b>Unit-IV Social Issues and the Environment:</b>	10
Environment ethics, issues and possible solutions; Urban waste water problems and their solutions, water conservation, rain water harvesting, case studies of water harvesting, domestic Bio-composting, Case studies of biogas generation at sewage treatment plants and the social issues involved. History of Environmental policies, Introduction to current national and international environmental legislations and treaties. Necessity and Importance of Environmental Audit. Organizations working on conservation of environment round the globe.	

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings/ References:

- Dara, S. S., & Mishra, D. D. *A textbook of Environmental Chemistry and Pollution Control*, S. Chand & Company Ltd.
- Dhameja, S. *Environmental Studies*. S. Kataria and Sons.
- Ristinen, R., & Kraushaar, J. *Energy and the Environment*, Wiley.
- Masters, G. *Introduction to Environmental Engineering and Science*, Prentice-Hall Publications.
- Basak, A. *Environmental Studies*, Pearson Publications.
- Bharucha, E., *Textbook of Environmental Studies*, Universities Press

Suggested List of Experiments: -

Suggested Case List: -

12

