

Institute/ School Name	School of Engineering and Technology		
Department Name	Department of Computer Science & Engineering		
Program Name	Bachelor of Engineering (Computer Science & Engineering): BE (CSE)		
Course Code	23ES001	Course Name	Environmental Science
L-T-P (Per Week)	2-0-0	Course Credits	02
Academic Year	2025-26	Semester/Batch	4 th /2024-28
Pre-requisites (if any)	None		
NHEQF Level	5.0	SDGs	6,13
Course Coordinator	Dr. Arun Lal Srivastav		

1. Scope and Objective of the Course:

This course provided knowledge and awareness about the introduction of environmental studies, environmental sustainability, sustainable development goals, natural resource management, renewable and non-renewable energy resources, biodiversity threats and conservation, air pollution, water pollution, noise pollution, thermal pollution, soil erosion, environmental laws, Chipko movement, waste management, climate change, disaster management etc.

2. Programme Outcomes (POs):

At the end of the programme, students will be able to achieve knowledge about the following:	
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

3. Course Learning Outcomes (CLO):

After completing the course, the students will be able to:

- CLO1:** Describe knowledge about all the natural resources, various ecosystems, energy resources, environmental pollution, waste management, biodiversity, and human population.
- CLO2:** Understand and gain knowledge about both natural (disasters such as floods and earthquakes) and anthropogenic (industrial pollution and global warming) environmental problems.
- CLO3:** Analyse the societal and environmental impacts of energy with respect to meet the growing energy needs for sustainable growth.
- CLO4:** Apply the above knowledge for conducting research to understand the interrelationships between natural world to address the real-world issues.
- CLO5:** Develop skills in the field of environmental conservation, water sciences, waste management, afforestation, values of biodiversity etc.

4. CLO-PO Mapping Matrix:

Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	NHEQF Level Descriptor
CLO1	-	M	-	-	-	-	-	-	-	-	H	-	Q1
CLO2	-	H	-	M	-	-	-	-	-	-	-	-	Q1, Q2
CLO3	-	-	-	-	-	-	-	H	M	-	-	-	Q4, Q5
CLO4	M	-	-	-	-	-	-	-	-	-	H	-	Q3, Q4
CLO5	L	-	-	-	-	-	H	-	L	-	-	-	Q5, Q6

5. ERISE Grid Mapping:

Feature Enablement	Level (1-5, 5 being highest)
Entrepreneurship	1
Research/Innovation	3
Skills	4
Employability	1

6. Recommended Books (Reference Books/Text Books):

- B01.** Bharucha, E. (1st Edition). Environmental Studies. Universities Press.
- B02.** Chawla, S. (1st Edition). Environmental Studies; Tata McGraw-Hill Education.
- B03.** Fundamentals of Environmental Science (1st Edition), Chitkara University Publication.

7. Other readings and relevant websites:

Resources	Link of Journals, Magazines, Websites and Research Papers
R1	https://pubs.acs.org/doi/abs/10.1021/es071719a
R2	https://www.tandfonline.com/doi/abs/10.1080/00958969909601874
R3	https://ehp.niehs.nih.gov/doi/abs/10.1289/ehp.01109871
R4	https://www.sciencedirect.com/science/article/abs/pii/S0048969711006462
Resources	Link of Audio-Video resources
V1	https://www.youtube.com/watch?v=fv5INudepMQ

V2	https://www.youtube.com/watch?v=v4HHR8eCGOA
V3	https://www.youtube.com/watch?v=wUwyYNeMV5I
V4	https://www.youtube.com/watch?v=u23WC8D2x4Y

8. Recommended Tools and Platforms:

Online platform of CPCB. (<https://cpcb.nic.in>)

9. Course Plan:

Lecture Number	Topics	Weightage in ETE	Instructional Resources
1-2	Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development.	10%	B01, B03, R2, V1, V4
3-4	Structure and function of an ecosystem. Producers, consumers and decomposers, energy flow in the ecosystem, food chains, food webs and ecological succession		
5-6	Introduction, types, characteristic features, and case study of the following ecosystems: a. Forest ecosystem, b. Grassland ecosystem, c. Desert ecosystem, d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	20%	B02, B03, R2, R3, V2
7-8	Natural Resources: Renewable and non-renewable resources Land resources and Land use change; land degradation, soil erosion and desertification, Deforestation: Causes and Impacts due to mining, dams building on environment, on forest, biodiversity and tribal populations.	10%	B01, B03, R1, V3
9-10	Water resources: Use and over exploitation of surface and ground water, floods, drought, conflicts over water (international and interstate).		B02, B03, R2
11-12	Energy resources: Renewable and non-renewable energy sources use of alternate energy sources, Growing energy needs, Case studies		B01, V3, R1
13-14	Biodiversity and Conservation: Definition, Levels of biological diversity: genetic, species and ecosystem diversity.		B01, B02, B03, R2
15-16	Bio-geographical classification of India. Biodiversity patterns and global biodiversity Hot-spots. India as a mega-biodiversity nation; Endangered and endemic species of India		B01, B03, R1,
17-18	Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions		B01, B02
19-20	Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and informational values.		B01, B03, R2
21-22	Environmental Pollution: Definition: types, Causes, effects and control measures of Air, Water		B02, B03, R2
23	Soil and Noise pollution		B01, B02, R3
24	Nuclear hazards and human health risks. Solid waste Management: control measures of urban and industrial wastes. Pollution case studies.		B02, B03, V3
25	Environmental Policies & Practices: Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.		B01, B02, B03
26-27	Environment Laws; Environment Protection Act; Air (Prevention and control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements; Montreal and Kyoto protocols and Conservation on Biological Diversity (CBD). Nature reserves,	10%	B02, B03, R2

	Tribal Populations and rights, and human wildlife conflicts in Indian context.		
28-29	Human Communities and the Environment: Human Population growth: Impacts on environment, human health and welfare. Resettlement and rehabilitation of project affected persons; case studies. Disaster management; floods, earthquake, cyclones and landslides.	10%	B01, R2
30	Environmental movements; <i>Chipko</i> , silent valley, <i>Bishnois</i> of Rajasthan. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (CNG vehicles in Delhi).		B01, B02, B03, R3

10. Industry Interventions: Carbon emission and its management in IT industries.

11. Innovative Pedagogies: Case studies of different types of pollution like Air quality index in New Delhi, Bhopal Gas tragedy etc. Further certification through Swayam https://onlinecourses.swayam2.ac.in/cec19_bt03/preview

12. Action plan for different types of learners:

Slow Learners	Average Learners	Advanced Learners
Remedial Classes	Practice Assignment	Swayam certification

13. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment (Offline/Online)
Internal Component*	Formative Assessments (FAs) - 1	01	20%	Online
	Formative Assessments (FAs) - 2	01	20%	Online
External Component*	End Term Examination (ETEs)	01	60%	Online
Total		100%		

*All assessment components are mandatory.

14. Details of Evaluation Components:

Evaluation Component	Description	Syllabus Covered (%)	Timeline of Examination	Weightage
Internal Component	FAs - 1	Up to 40% (Lectures 1-12)	Will be intimated in due course	40%
	FAs - 2	41% - 80% (Lectures 13-24)		
External Component	End Term Examination*	60%		60%
Total				100%

* Minimum 75% attendance is required to become eligible for appearing in the End Semester Examination

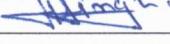
15. Format of Evaluation Components:

Type of Assessment	Total Marks	1 Mark MCQ	2 Marks	3 Marks	5 Marks
Formative Assessments (FAs) - 1	20	20	-	-	-
Formative Assessments (FAs) - 2	20	20	-	-	-
End Term Examination	60	60	-	-	-

16. Revision (if any):

Academic Year of Previous Version		Percentage of Revision	

17. This document is:

Designation	Name	Signature
Prepared by Course Coordinator	Dr. Arun Lal Srivastav	
Verified by Assistant Dean	Dr. Hakam Singh	
Date	12/01/2026	