Gyanmanjari Innovative University

Syllabus
Faculty of Engineering & Technology
Semester-1

Subject: Environmental Science: Solutions for a Better Tomorrow- BET1XX1120

Type of course: Value Added Course

Prerequisite: Basic knowledge of environment and ecology.

Rationale: To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks		Total Marks
CI	T	P	C	SEE	CCE	
2	0	0	2	100	50	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Unit No.	Course content	Hrs.	% Weightage
1	**Chapter-1 Environment and Ecosystem** Definition, scope and importance, Need for public awareness. **Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids. **Examination Style:**	6	20%

Sr. No.	Evolution Methods	SEE	CCE
1.	Food Web Puzzle & Pyramid Building	10	
2.	Quiz		10
3.	Documentary Review	10	
Total		**20**	**10**

1. Food Web Puzzle & Pyramid Building" (10 Marks)

<table>
<tr><td></td><td>Objective: Understand inter connectedness of species and trophic levels
Activity:
• Faculty will provide images or cards of various species. Students connect them into food chains and webs.
• Then construct an ecological pyramid and mark biomass or energy at each level.
2. Quiz (10Marks)
MCQ will be provided from the unit. 1 mark for each correct answer.
3. Documentary Review (10 Marks)
A documentary will be suggested by the faculty and will be reviewed (Minimum 300 Words) by the student.</td><td></td><td></td></tr>
<tr><td>2</td><td>Chapter-2 Environmental Pollution
Definition, Causes, effects and control measures of:
(a) Air pollution
(b) Water pollution
(c) Soil pollution
(d) Noise pollution
(e) Nuclear hazards.
Examination Style:
<table>
<tr><th>Sr. No.</th><th>Evolution Methods</th><th>SEE</th><th>CCE</th></tr>
<tr><td>1.</td><td>Pollution Diary / Journal Activity</td><td></td><td>10</td></tr>
<tr><td>2.</td><td>Poster making: From Trash to Tragedy – The Pollution Story</td><td>20</td><td></td></tr>
<tr><td colspan="2">Total</td><td>20</td><td>10</td></tr>
</table>
1. ALA-Pollution Diary / Journal Activity (10 Marks)
Objective: Reflect on personal environmental footprint
Task:
Keep a 3-day journal of personal pollution contribution (plastic use, travel emissions, noise, etc.)Reflect on what changes can be made.
Deliverable: Diary entry summary + action plan
2. Poster making: From Trash to Tragedy – The Pollution Story (20 Marks
• Brief overview of pollution as a pressing global issue.
• Highlight how improper waste disposal leads to environmental degradation.</td><td>6</td><td>20%</td></tr>
<tr><td>3</td><td>Chapter-3: Natural Resources
(a)Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.</td><td>6</td><td>20%</td></tr>
</table>

(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

(c) Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Examination Style:

Sr. No.	Evolution Methods	SEE	CCE
1	Field Visit Report		10
2.	Case Study Report	10	
3.	Short note on natural resources	10	
TOTAL		20	10

Activity No. 1 Field Visit Report / Virtual Field Stud (10 Marks)

- A local dam site or mining area
- A community practicing rainwater harvesting.

Then ask students to write a report answering:

- What are the environmental concerns?
- What are the socio-economic implications?

Activity No. 2. ALA- Case Study Report (10 Marks)

- **Task:** Faculty will assign students one of the following real-life problems.
- Salinity in Punjab
- Water logging in Haryana
- Desertification in Rajasthan
- Other

Activity No.3. Short note on natural resources (10 Marks)

4	**Chapter-4 Bio-diversity and its Conservation** Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity **Case study - Gir forest Gujarat conservation of Asiatic lions** **Examination Style:**	6	20%

Sr.	Evolution Methods	SEE	CCE

No.			
1.	Situation given by faculty: Should Zoos Exist?		10
2.	Biodiversity Hotspots of India" – Mapping	10	
3.	From Roots to Rights: A Biodiversity Appeal	10	
	Total	20	10

Activity No. 1.ALA- Role-play/Debate: "Should Zoos Exist?" (10 Marks)
Objective: Understand ex-situ vs in-situ conservation
Task: Divide students into two groups: Pro-Zoo (ex-situ) vs Anti-Zoo (prefer in-situ)include points on ethics, conservation success, animal rights
Deliverable: Debate summary + one-page position paper
Activity No. 2. "Hotspots of India" – Mapping (10 Marks)
Objective: Understand India's rich biodiversity
Task: Ca biodiversity hotspot map of India
Ex. Western Ghats, Himalayas, Indo-Burma region, Sundaland.
Activity No. 3. From Roots to Rights: A Biodiversity Appeal
Task Description:(10 Marks)
Write a persuasive letter titled "Roots to Rights: A Biodiversity Appeal"
You may address it to:
- A Government Environmental Authority
- A Member of Parliament
- The General Public or Media

5	**Chapter-5: Environmental issues** Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. **Case studies: In Nuclear holocaust in Japan 1945**	6	20

Examination Style:

Sr. No.	Evolution Methods	SEE	CCE
1	Why Did It Happen?" Forensic Report Activity	10	
2	Role as a Green Advocate (Speech)	10	
3.	Acid Rain in a Jar		10
Total marks		20	10

Activity: 1. "Why Did It Happen?" Forensic Report Activity (10 Marks)
Task: Given an environmental disaster (e.g., acid rain or nuclear leak etc…), students write a forensic-style report:

	• What caused it? • Which laws were violated or missing? • Recommendations to prevent future incidents **Evaluation Focus:** Cause-effect analysis, scientific reasoning, understanding of legal gaps. **Activity: 2. Role as a Green Advocate (Speech Competition) (10 Marks)** **Prompt:** "If I were the Environment Minister of India..." Students present what laws they would create, strengthen, or reform. **Evaluation Focus:** Vision, legal knowledge, leadership thinking **Activity: 3. ALA - "Acid Rain in a Jar" – Simple Experiment (10 Marks)** **Objective:** Demonstrate acid rain impact **Task:** Use vinegar or lemon juice to simulate acid rain on chalk, leaves, or iron Observe chemical reactions and physical changes over time **Deliverable:** photos + conclusion		

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	10%	20%	30%	10 %	10%

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:

CO1	Understand of key environmental concepts and ecosystem.
CO2	Evaluate pollution control strategies and propose sustainable practices to minimize environmental hazards and promote cleaner technologies
CO3	Propose sustainable practices for the conservation and efficient utilization of natural resources to mitigate overexploitation and ensure ecological balance
CO4	Recognize India's status as a mega -Diversity nation, and identify major biodiversity hotspots and their significance.
CO5	Identify and analyze environmental problems, such as climate change, Global warming

	and Acid rain.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

1. Perspectives in Environmental studies
2. Environmental studies by Dr. D.L. Manjunath, Pearson Education-2006
3. Environmental studies by R. Rajagopalan, Oxford Publication-2005
4. Principles of Environmental Science by Curnningham. W.P. & Cunningham M.A.,TataMcGraw Hill Publishing Co. Ltd., New Delhi.
5. Textbook of Environment & Ecology by Deeksha Dave and S.S. Katewa,Cengage Learning India Pvt. Ltd., Patparganj, Delhi, 2009
6. Environmental studies by Benny Joseph, Tata MCgraw-Hill-2005