SACRED HEART COLLEGE Autonomous	**Sacred Heart College (Autonomous), Thevara**

Programme	**BA/BSc/B Com**					
Pathway	**MDC**					
Course Name	**FUNDAMENTALS OF ENVIRONMENTAL SCIENCE**					
Type of Course	**MDC**					
Course Code	**To be prepared by the BoS after Common Instruction reg.**					
Course Level	**100-199**					
Course Summary	The course give overview of the sources, impacts, and management strategies associated with pollution in various environmental compartments. Students will gain a thorough understanding of air, water, and soil pollution, exploring the major pollutants, their origins, and the potential consequences on ecosystems and human health. The course covers key principles and methodologies for monitoring and assessing pollution levels, as well as regulatory frameworks and policies aimed at pollution prevention and control. Additionally, students will examine case studies to apply theoretical knowledge to real-world pollution scenarios, fostering critical thinking and problem-solving skills. Throughout the course, an emphasis is placed on sustainable practices, technological innovations, and interdisciplinary approaches to address the multifaceted challenges posed by environmental pollution.					
Semester	1/2	**Credits** **One credit** = 15 hour of teaching (lecture or tutorial) or 30 hours of practical			3	45 Hours
Course Details	Learning Approach	**Lecture:-** Oral Presentation, Expert-Led, One-Way Communication, Structured Content, Visual Aids, Large Audience **1 Hour = 1 Hour**	**Tutorial:-** Structured Learning, Targeted Instruction, Format Diversity, Self-Paced or Guided, Hands-On Application, Problem-Solving,	**Practical** **1 Hour = ½ Hour**	**Others** (Online and Blended Learning, gamification, Personalized Learning, Augmented Reality (AR) and Virtual Reality (VR))	

			Feedback and Assessment, Visual Aids **<u>1 Hour = 1 Hour</u>**			
Pre-requisites courses if any	No such requirement for this course					

COURSE OUTCOMES (COs) (4-6) / CLOs

CO No.	**Expected Course Outcomes: -** At the end of the course the student will be able to.	Learning Domains *	PO No
1	Understand of key concepts and the interconnected nature of environmental systems	U	
2	Apply ecological principles to analyze ecosystem dynamics, showcasing the ability to comprehend factors influencing ecosystem stability, resilience, and response to disturbances	A, An	
3	Develop a comprehensive understanding of natural resources, demonstrating knowledge of their types, characteristics, and significance in supporting ecosystems and human societies	Cr	
4	Analyze threats to biodiversity and their impacts on species and ecosystems	An	
5	Understand the causes, effects, and management of various types of pollution, demonstrating the ability to propose effective control measures and sustainable practices for pollution prevention	U, An	
6	Create awareness of social issues related to the environment and develop skills in policy advocacy	C	

*** Categorized into three: -**

<u>1. Cognitive domain</u>: - Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

<u>2. Affective domain: -</u> Receiving, Responding, Valuing, Organization, Characterization

<u>3. Psychomotor domain: -</u> Reflex, Basic fundamental movements, Perceptual abilities, Physical abilities, Skilled movements, non-discursive communication

COURSE CONTENT

Content for Classroom transaction (Units) * *More units enhance learning by enabling diverse assessments, flexible learning design, efficient resource management, and thorough blueprint coverage.*

Module	Unit	Description	Hours
Module 1: Introduction	**1.1**	Definition, scope and importance	0.5
	1.2	Need for public awareness	0.5
Module 2: Ecosystems	**2.1**	Concept of an ecosystem	1
	2.2	Structure and function of an ecosystem	1
	2.3	Producers, consumers and decomposers	1
	2.4	Energy flow in the ecosystem	1
	2.5	Ecological succession	1
	2.6	Food chains, food webs and ecological pyramids	2
	2.7	Introduction, types, characteristic features, structure and function of the following ecosystem: Forest, Grassland, Desert, Aquatic ecosystems	4
Module 3: Natural Resources	**3.1**	Renewable and non-renewable resources – Forest, Water, Mineral, Food, Energy and Land resources	8
	3.2	Role of an individual in conservation of natural resources	1
Module 4: Biodiversity and its conservation	**4.1**	Introduction – Definition: genetic, species and ecosystem diversity	1
	4.2	Biogeographical classification of India	0.5

	4.3	Value of biodiversity	1
	4.4	Biodiversity at global, National and local levels	1
	4.5	India as a mega-diversity nation	0.5
	4.6	Hot-spots of biodiversity	0.5
	4.7	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflict	2
	4.8	Endangered and endemic species of India	0.5
	4.9	Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	2
Module 5: Environmental Pollution	**5.1**	Definition, cause, effects and control measures of: Air, Water, Soil, Marine, Noise, Thermal pollution	6
	5.2	Nuclear hazards	1
	5.3	Solid waste Management: Causes, effects and control measures of urban and industrial wastes	2
Module 6: Social Issues and the Environment	**6.1**	Environmental ethics: Issues and possible solutions	1
	6.2	Climate change, global warming, acid rain, ozone layer depletion	2
	6.3	Wasteland reclamation	1
	6.4	Rules and Regulations: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act	2

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Interactive lectures, Group discussions, Problem-based learning, Case studies, Flipped classroom, Lecture-based Learning, Discussion-based Learning, Project-Based Learning, Case-based Learning, Experiential Learning, Cooperative Learning, Inquiry-Based Learning, Game-Based Learning, Socratic Method, Peer Teaching, Simulations and Role-Playing, Online Learning, Blended Learning, Differentiated Instruction, Mind Mapping, Reflective Practice, Interdisciplinary Learning, and Mentorship are diverse teaching and learning approaches.

<table>
<tr><td>Technology Integration: Possibilities</td><td colspan="2">

Learning Management Systems (LMS)
Interactive multimedia tools
Collaborative online platforms and social learning
AI-powered tools and adaptive learning

</td></tr>
<tr><td rowspan="2">Assessment Types</td><td>MODE OF ASSESSMENT
1. Continuous Comprehensive Assessment (CCA)-30 %- Formative assessment/Internal

Practical Assignment
Observation of practical skills
Viva voce
Quiz
Interview
Oral presentations
Computerized adaptive testing
In-class discussions
Group Tutorial work
Reflection writing assignments
Home assignments
Self and peer Assessments
Any other method as may be required for specific course / student by the course faculty
</td><td>Specific Learning Outcomes for each mode</td></tr>
<tr><td colspan="2">2. Semester End examination-70 %- Summative Assessment/External - Any of following.

Written test
Open book test
Laboratory report
Problem based assignments
Individual project report
Case study report
Team project report
Literature survey
</td></tr>
</table>

	• **Standardized Test** • **Any other pedagogic approach specifically designed for a particular course by the course coordinator.**

End Semester Evaluation

Credits	Total Marks	CCA	ESE	Examination & Evaluation Mechanism
2	**50**	**15**	**35**	**Written Examination**
3	**75**	**22.5**	**52.5**	**Multiple Choice**
4	**100**	**30**	**70**	**Open Book**
				Any other mode as decided by the BoS

End Semester Evaluation

Mode	Time (in Hours)	
	Minimum	**Maximum**
Written Examination	**1**	**2**
Multiple Choice	**1**	**1.5**
Open Book	**1**	**2**
Any Other Mode	**1**	**2**

RUBRIC

					Outcomes
Excellent	Good	Fair	Poor		
Master	Apprentice	Beginner			
Exemplary	Accomplished	Developing	Beginning	Undeveloped	
Complete	Incomplete				

Steps in Rubric

1. Define the Purpose

The first step in the rubric-creation process is to define the **purpose of the assignment or assessment for which you are creating a rubric**.

2. Decide What Kind of Rubric You Will Use

Types of rubrics: holistic, analytic/descriptive, single-point.

- **A holistic rubric** consists of a single scale with all the criteria to be included in the evaluation (usually on a 1-4 or 1-6 point scale) based on an overall judgment of the student's work.
- **An analytic rubric** resembles a grid with the criteria for an assignment listed in the left column and with levels of performance listed across the top row, often using numbers and/or descriptive tags. When scoring with an analytic rubric, each of the criteria is scored individually.
- **Single-Point Rubric -** the components of an assignment into different criteria. The detailed performance descriptors are only for the level of proficiency. Feedback space is provided for instructors

to give individualized comments to help students improve and/or show where they excelled beyond the proficiency descriptors.

4. Design the Rating Scale

6. Create your Rubric

References

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
3. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co.
4. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
5. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
6. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media
7. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

Module	Unit	Description	CO No.
Module 1: Introduction	1.1	Definition, scope and importance	CO1
	1.2	Need for public awareness	CO6
Module 2: Ecosystems	2.1	Concept of an ecosystem	CO1, CO2
	2.2	Structure and function of an ecosystem	CO2
	2.3	Producers, consumers, and decomposers	CO2
	2.4	Energy flow in the ecosystem	CO2
	2.5	Ecological succession	CO2
	2.6	Food chains, food webs, and ecological pyramids	CO2
	2.7	Types and characteristics of ecosystems: Forest, Grassland, Desert, Aquatic ecosystems	CO2
Module 3: Natural Resources	3.1	Renewable and non-renewable resources – Forest, Water, Mineral, Food, Energy, and Land resources	CO3
	3.2	Role of an individual in conservation of natural resources	CO6
Module 4: Biodiversity and Its Conservation	4.1	Introduction – Definition: genetic, species, and ecosystem diversity	CO4
	4.2	Biogeographical classification of India	CO4
	4.3	Value of biodiversity	CO4
	4.4	Biodiversity at global, national, and local levels	CO4
	4.5	India as a mega-diversity nation	CO4
	4.6	Hotspots of biodiversity	CO4
	4.7	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflict	CO4
	4.8	Endangered and endemic species of India	CO4
	4.9	Conservation of biodiversity: In-situ and Ex-situ conservation	CO4
Module 5: Environmental Pollution	5.1	Definition, causes, effects, and control measures of: Air, Water, Soil, Marine, Noise, and Thermal pollution	CO5
	5.2	Nuclear hazards	CO5
	5.3	Solid waste management: Causes, effects, and control measures of urban and industrial wastes	CO5
Module 6: Social Issues and the Environment	6.1	Environmental ethics: Issues and possible solutions	CO6
	6.2	Climate change, global warming, acid rain, ozone layer depletion	CO6
	6.3	Wasteland reclamation	CO6
	6.4	Rules and Regulations: Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act	CO6