

**Environmental Education Measure**

**Compulsory Ability Enhancement course on environmental sciences for all**

**Undergraduate programs in SRIHER**

HAE001: <b>Environmental Science</b>														
Ability Enhancement Course for <b>UG</b> programs under CBCS														
[Dept.: <b>Environmental Health Engineering</b> ]														
Course code	Category	Course Title	Credits / Week			Credits(C)	Hours/ semester (15 WEEKS)				CIA - (a) MARKS	End Semester Department		Grand Total
			OL	OA	Practical		OL+OA	Practical / SI	Total hours	Attendance (%)		Theory (b)	Practical/ Viva (c)	
											PM: 40 %	EST	ESP	a = 100
HAE001	AE	<b>Environmental Science</b>	0.5	0.5	1	2	30	30	60	80	100	-	-	PM: 40%

1	<b>Name of the Course</b>	Environmental Science					
2	<b>Elective Code</b>	HAE001	<b>Credits: 2</b>				
3	<b>Level</b>	Any student enrolled in Under Graduate programs under CBCS					
4	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. Introduce about current environmental problems, manage green environment, and participate in green initiatives.</li> <li>2. Introduce about natural resources and energy resources and the needs for alternate energy sources.</li> <li>3. Provide necessary knowledge to understand the various types of pollution and their medication steps and environmental laws</li> <li>4. Participate in outreach activities including environmental applications and problem solving in off-campus community settings.</li> </ol>					
5	<b>Rationale for inclusion</b>	Gaining knowledge on current environmental problems, common sources, routes of exposure, mechanisms of health effects of various pollutions, and control measures will enable the learners to apply the learned concepts to safe guard environment and health.					
6	<b>Delivery method</b>	<ul style="list-style-type: none"> <li>• <b>Online Learning</b> OL - Online Learning (Video tutorials, Podcasts, External links, Articles, E books)</li> <li>• <b>Online/Offline Activities including Assessment</b> OA - Online activities (Discussion forum, Reflection, Blogs)</li> <li>• <b>Synchronous Interaction</b> SI - Synchronous Interaction (Live interactions through Google meet / Big Blue Button / In person)</li> <li>• <b>Independent Learning</b> IL - Independent Learning **Approximately double the Online learning hours)</li> </ul>	<b>Hours per credit</b> <table border="1"> <tr><td>15</td></tr> <tr><td>30</td></tr> <tr><td>30</td></tr> <tr><td>15</td></tr> </table>	15	30	30	15
15							
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7	<b>Credit</b>	Online Learning Online Activities including Assessment Synchronous Interaction  <b>Total Credit</b>	<b>Hours per credit</b> 15 OL hours = 0.5 15 OA hours = 0.5 15 SI hours = 1  <b>2</b>				
		Credit assigned based on the course objectives and learning outcomes.					
8	<b>Learning outcomes</b>	On successful completion of the course the students should be able to <ol style="list-style-type: none"> <li>1. Describe the structure and function of the ecosystem, natural resources and conservation</li> <li>2. Understand and describe the processes and mechanisms by which hazards are produced, released, transported, and modified in the environment and affect health.</li> </ol>					

		<p>3. Apply management practices to environmental and occupational health issues.</p> <p>4. Identify the implications of environmental policies and standards on compliance with regulatory, standard setting organizations and international policies.</p>																																																		
9	<b>Summary</b>	This course introduces the learners to the major current environmental problems, create awareness about ecosystem and various pollutions which pose health risks to the exposed populations and environment. Further the course helps to recognize and control these pollutions thereby safeguarding environment and our health.																																																		
10	<b>Assessment</b>	<p>Course Instructors are encouraged to provide equal Weightage to all the Online assessments.</p> <p><b>Continuous Assessment (50 Marks) :</b></p> <table border="1"> <thead> <tr> <th></th> <th>Course Outcomes</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>Test 1</td> <td>CO-1</td> <td>10</td> </tr> <tr> <td>Test 2</td> <td>CO-2</td> <td>10</td> </tr> <tr> <td>Test 3</td> <td>CO-3</td> <td>10</td> </tr> <tr> <td>Assignment</td> <td>CO-3 &amp; CO-4</td> <td>20</td> </tr> <tr> <td><b>IA Total</b></td> <td></td> <td><b>50</b></td> </tr> </tbody> </table>		Course Outcomes	Marks	Test 1	CO-1	10	Test 2	CO-2	10	Test 3	CO-3	10	Assignment	CO-3 & CO-4	20	<b>IA Total</b>		<b>50</b>																																
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11	<b>Course Content and Teaching Method :</b>	<table border="1"> <thead> <tr> <th>Learning outcomes</th> <th>OL hrs</th> <th>OA &amp; A Hrs</th> <th>SI Hrs</th> <th>SLO-CO mapping</th> </tr> </thead> <tbody> <tr> <td><b>UNIT – I</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1. Gain insight in to current issues in india, environmental education and awareness</td> <td>2</td> <td>2</td> <td>3</td> <td>1</td> </tr> <tr> <td>2. Define physical, chemical and biological factors in the environment</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Recognize the structure and function, structure and composition of atmosphere, meteorology,</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Discuss the energy flow in the ecosystem, food chains, food webs, ecological pyramids</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>UNIT – II</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1. Gain insight into use and benefits, over utilization, degradation, exploitations and associated problems:</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> </tr> <tr> <td>2. Learn about forest; water, mineral, food, land and ocean resources</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Discuss the energy resources and needs for alternate energy sources.</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Learning outcomes	OL hrs	OA & A Hrs	SI Hrs	SLO-CO mapping	<b>UNIT – I</b>					1. Gain insight in to current issues in india, environmental education and awareness	2	2	3	1	2. Define physical, chemical and biological factors in the environment					3. Recognize the structure and function, structure and composition of atmosphere, meteorology,					4. Discuss the energy flow in the ecosystem, food chains, food webs, ecological pyramids					<b>UNIT – II</b>					1. Gain insight into use and benefits, over utilization, degradation, exploitations and associated problems:	4	3	3	2	2. Learn about forest; water, mineral, food, land and ocean resources					3. Discuss the energy resources and needs for alternate energy sources.				
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	<b>UNIT – III</b>	<p>1. Delineate source, cause, effects and control measures of- air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution</p> <p>2. Understand the effect and control measures of nuclear hazards, occupational hazards, hazardous wastes, municipal wastes, biomedical wastes, electronic wastes, plastic wastes</p> <p>3. Define solid wastes, municipal wastes, biomedical wastes, electronic wastes, plastic wastes</p> <p>4. Gain insight in to safety hazards in fireworks industries, disaster management</p>	5	3	4	3
	<b>UNIT – IV</b>	<p>1. Understand the environment protection related acts, issues involved in enforcement of environmental legislation and public awareness.</p> <p>2. Learn about urban problems related to energy and water conservation, resettlement and rehabilitation of people</p> <p>3. Describe Environmental ethics, Human Rights.</p> <p>4. Understand about HIV/AIDS role of information technology in environment and human health, case studies.</p>	4	3	3	4
	<b>UNIT – V</b>	<p>1. Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain</p> <p>2. Study of simple ecosystems</p>	0	4	2	5
			<b>15</b>	<b>15</b>	<b>15</b>	
12	<b>Reference books</b>	<p>1. <a href="https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf">https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf</a></p> <p>2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.</p> <p>3. Bharucha Ersch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –350 013, India, Email:mapin@icenet.net (R)</p> <p>4. Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)</p> <p>5. Cunningham, W.P. Cooper, T.H. Gorhani, E &amp; Hepworth, M.T. 2001. Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p</p> <p>6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.</p>				
13	<b>Online resources</b>	<p>1. <a href="https://study.com/academy/lesson/what-is-environmental-science-definition-and-scope-of-the-field.html">https://study.com/academy/lesson/what-is-environmental-science-definition-and-scope-of-the-field.html</a></p> <p>2. <a href="http://www.prospects.ac.uk/options_environmental_science.htm">http://www.prospects.ac.uk/options_environmental_science.htm</a></p> <p>3. <a href="https://www.cseindia.org/">https://www.cseindia.org/</a></p> <p>4. <a href="https://www.weforum.org/">https://www.weforum.org/</a></p> <p>5. <a href="https://www.epa.gov/">https://www.epa.gov/</a></p>				

14	<b>Syllabus Content :</b>	Environmental Science (HAE001)
	Unit – I Multidisciplinary nature of environmental studies and Ecosystem	Scope of environmental science, Physical, Chemical and Biological factors in the environment, Concept of an ecosystem- Types, Structure and function, Structure and composition of atmosphere, Meteorology, Energy flow in the ecosystem, Food chains, food webs and Ecological pyramids, Current issues in India, Environmental education and awareness
	Unit – II Natural Resources, Biodiversity and its conservation:	Natural resources- Use and benefits, over utilization, degradation, Exploitations and Associated problems: Forest; Water, Mineral, Food, Land and Ocean resources, Energy resources and needs, Alternate energy sources, Conservation of natural resources, Biodiversity at global, National and local levels- Bio geographical classification of India, Threats to biodiversity and Hot-spots, Endangered and endemic species of India, Conservation of biodiversity
	Unit – III Environmental Pollution and Social Issues	Source, Cause, effects and control measures of- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Occupational hazards, Hazardous and solid wastes- Municipal wastes, Biomedical wastes, Electronic wastes, Plastic wastes, Industrial chemicals, Chemical, Physical & Safety hazards in Fireworks Industries, Disaster management, Urban problems related to energy and Water conservation, Resettlement and Rehabilitation of people, Environment protection related Acts, Issues involved in enforcement of environmental legislation and Public awareness.
	Unit – IV Human Population and the Environment	Population growth and explosion variation among nations, Family Welfare Programme, Environment and human health, Women and Child Welfare, Environmental ethics, Human Rights, Value Education, HIV/AIDS, Role of Information Technology in Environment and human health, Case Studies.
	Unit – V Field work	Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, recycling and reusing the biodegradable and dry waste etc.

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