



University of Kerala

Discipline	ZOOLOGY				
Course Code	UK3DSEZOO203				
Course Title	Environmental Science I- Global Environmental issues				
Type of Course	DSE				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	4 hours	-	-	4
Pre-requisites	Pass in Class XII				
Course Summary	The course on Global Environmental Issues provides a comprehensive overview of the significant environmental challenges facing the planet today. It examines the complex interactions between human activities and the natural environment, focusing on climate change, biodiversity loss, pollution, resource depletion, and habitat destruction. Students explore the scientific, social, economic, and political dimensions of these issues through a multidisciplinary approach and analyse potential solutions.				

Detailed Syllabus

Module	Unit	Content	60 hrs
		Introduction to Environmental Issues	5
I	1.1	Environmental Issues: Definition. United Nation's Triple Planetary Crisis (Climate change, Pollution and Biodiversity loss). A brief account of the environmental tax.	1
	1.2	Efforts of UN and UNEP to Reduce Environmental Issues: The UN Decade on Ecosystem Restoration (2021-2030). A brief account of the UN Environment Programme (UNEP).	2
	1.3	Diversity of life on Earth and humanity's impact on the planet's ecological balance. (The topic can be explored through the screening of the non-copyrighted documentary film "Home" (2009) by Yann Arthus-Bertrand. This film captures landscapes across all continents, including Antarctica, spanning 54 countries. Following the screening, a report can be made based on the documentary).	2

II		Environmental Issues Associated with Climate Change	15
	2.1	Climate Change: Concept of climate change. Causes of climate change (Burning fossil fuels, Deforestation, and Industrial processes). Effects of climate change (Brief account of Rising temperatures, Sea-level rise, Extreme weather events, and Disruptions to ecosystems and biodiversity). (Debate can be adapted for learning).	3
	2.2	Ozone Layer Depletion: Definition. A brief account of the Ozone depletion process. Effects of ozone depletion (Effects on human and animal health, Effects on terrestrial plants, Effects on aquatic ecosystems, Effects on bio-geo-chemical cycles, Effects on air quality). Briefly describe control measures.	4
	2.3	Global Warming: Concept of global warming. Greenhouse gases - (Carbon dioxide (CO ₂), Methane (CH ₄), and Nitrous oxide (N ₂ O), from human activities such as burning fossil fuels for energy, deforestation, industrial processes, and agriculture.	4
	2.4	Sea Level Rise: Concept of sea level rise. Causes (Ocean heating, Antarctic ice loss, Greenland ice sheet loss, Mountain glacier loss, and Sea ice loss). Briefly describe its effect on ecosystems and biodiversity. (Discussion mode of learning can be adapted).	4
III		Pollution-Related Environmental Issues	15
	3.1	Air Pollution: Pollution resolution by UN Environment Assembly (2024). Brief accounts on air pollution from fossil fuels, and indoor air pollution health issues.	2
	3.2	Health issues of Air Pollution: Death toll associated with air pollution. A brief account of Air pollution-related human diseases (Respiratory infections, Heart disease, Chronic obstructive pulmonary disease (COPD), Stroke, and Lung cancer). (A quiz can be administered utilising the Mentimeter App for the learning experience).	4
	3.3	Environmental Disasters Caused by Air Pollution: Brief account of Great Smog 1952 (UK), and Bhopal Gas Tragedy 1994 (India). (Poster presentation can be adapted for learning. Group activity, Maximum 5 students in a group).	3
	3.4	Water Pollution: Degradation of aquatic ecosystems – (Fresh, Coastal, and Ocean waters). A brief account of the impact of water pollution on human health.	2
	3.6	Environmental Disasters Caused by Water Pollution: <i>Exxon Valdez</i> oil spill 1989 and Gulf War oil spill 1991.	1
	3.7	Soil Pollution: Mention major causes. Brief account on Microplastics, Oil spills, Mining, Nuclear waste, E-waste, Pesticides, and Herbicides. Mention major cleanup options. Impact of water pollution on human health (Brief account only).	2
	3.9	Environmental Disasters Caused by Soil Pollution: Mercury Poisoning at Minamata and Niger Delta oil spills. (Poster presentation can be adapted for learning, Group activity, Maximum 5 students in a group).	1

IV		Biodiversity Loss	13
	4.1	Biodiversity Loss: Concept of Biodiversity loss. Global biodiversity loss. A brief account on Hot spots. Brief account on Convention on Biological Diversity (CBD).	2
	4.2	Causes of Biodiversity Loss: Habitat loss, Habitat fragmentation and Habitat degradation, Land use intensification, Nutrient pollution and other forms of pollution (Air and Water pollution). Overexploitation and unsustainable use (Unsustainable fishing methods, Overfishing, Overconsumption and Human overpopulation), Invasive species and their competition with indigenous species, and Climate change. (Quiz competition can be adapted for mode of learning, Group activity, Maximum 5 students in a quiz team).	5
	4.3	Biodiversity Loss and its Impacts on Ecosystems: Food, Agriculture, Health, and Medicine.	3
	4.4	Loss of Critical Biodiversity on a Global Scale: Coral Bleaching and Biodiversity Loss in Great Barrier Reef of Australia, 2019 Amazon rainforest wildfires. (Poster presentation by students can be adapted for the learning experience, Group activity, Maximum 5 students in a group).	3
V		Significant Environmental Challenges on a Global Scale	12
	5.1	Water Scarcity: Concept of water scarcity. Water stress, droughts, and conflicts over water resources. Impact on agriculture, industry, and human health. Economic impacts on society. Brief account on water conservation strategies.	2
	5.2	Desertification: Definition. Causes (Immediate causes, Influence of human activities, Natural variations, Climate change). A brief account of effects (Sand and dust storms, Food insecurity, Increasing poverty). Mention major geographic areas affected by desertification (Sahel, Gobi Desert and Mongolia, South America). Mention reversal of desertification through improving soil quality, desert greening, better managed grazing and planting trees. (PowerPoint presentation can be adapted for learning experience, Group activity, Maximum 5 students in a group).	3
	5.3	Eutrophication: Nitrogen pollution, Effect of eutrophication on aquatic ecosystems. (Poster presentations by students can be adapted for the learning experience, Group activity, Maximum of five students in a group).	2
	5.4	Ocean Acidification: Definition. Cause and effects. Impacts on oceanic calcifying organisms, Harmful algal bloom, Impact on fish larvae. Impacts on fishery and tourism industry. Mention the UN Ocean Decade program Ocean Acidification Research for Sustainability and Global Ocean Acidification Observing Network (GOA-ON). (PowerPoint presentations by students can be adapted for the learning experience. Group activity, Maximum of five students in a group).	2

5.5	Microplastic Pollution: Definition. Sources. Effects on marine life, Food chain contamination, and risks to human health. (Awareness lecture and a Quiz competition for students can be adapted, A Maximum of five students in a Quiz Team).	2
5.6	Nuclear Accidents: Nuclear accidents and their environmental impact. Brief account of the Three Mile Island Accident 1979, Chernobyl Disaster 1986 and Fukushima Accident 2011. (Poster presentation by students can be adapted for the learning experience, Group activity, A Maximum of 5 students in a group).	1

References

1. Gary S. Moore (2015). Global Environmental Issues, Routledge.
2. David E. Lorey (2017). Global Environmental Issues, CRC Press.
3. Frances Harris (2019). Global Environmental Issues, Wiley-Blackwell.
4. Dube R. K. (2008). Global Environmental Issues, Daya Publishing House.
5. Richard N. L. and Andrews (2012). Environmental Science: Global Environmental Issues, Jones & Bartlett Learning.

Suggestive Readings:

1. Elizabeth Kolbert (2014). The Sixth Extinction: An Unnatural History. Henry Holt and Co.
2. Naomi Klein (2014) This Changes Everything: Capitalism vs. The Climate. Simon & Schuster.
3. David Wallace-Wells (2019). The Uninhabitable Earth: Life After Warming. Tim Duggan Books.
4. Rachel Carson (1962). Silent Spring. Houghton Mifflin.
5. Jeff Goodell (2017). The Water Will Come: Rising Seas, Sinking Cities, and the Remaking of the Civilized World. Little, Brown and Company.
6. Bill McKibben (1989). The End of Nature. Random House.
7. Elizabeth Kolbert (2014). The Sixth Extinction: An Unnatural History. Henry Holt and Co.
8. Richard Leakey and Roger Lewin (1995). The Sixth Extinction: Patterns of Life and the Future of Humankind. Anchor Books.
9. Bill McKibben (2010). Eearth: Making a Life on a Tough New Planet. Henry Holt and Co.
10. Bengt-Owe Jansson, C. S. Holling, Carl Folke, Charles Perrings, Karl-Goran Maler (1997). Biodiversity Loss: Economic and Ecological Issues. Cambridge University Press.
11. Bill Gates (2021). How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need. Published by Knopf.
12. Tom Rivett-Carnac (2020). The Future We Choose: Surviving the Climate Crisis. Published by Knopf.

Web resources:

1. <https://www.youtube.com/watch?v=jqxENMKaeCU>
2. <https://www.unep.org/news-and-stories/story/soil-pollution-risk-our-health-and-food-security>
3. <https://www.fao.org/documents/card/en?details=cb4894en>

4. United Nations Environment Programme (UNEP): <https://www.unep.org>
5. World Wildlife Fund (WWF): <https://www.worldwildlife.org>
6. Intergovernmental Panel on Climate Change (IPCC): <https://www.ipcc.ch>
7. National Geographic Environment: <https://www.nationalgeographic.com/environment>
8. Environmental Protection Agency (EPA): <https://www.epa.gov>
9. Global Environment Facility (GEF): <https://www.thegef.org>
10. Climate Action Tracker: <https://climateactiontracker.org>
11. Greenpeace: <https://www.greenpeace.org>
12. The Nature Conservancy: <https://www.nature.org>
13. Earthwatch Institute: <https://earthwatch.org>
14. Chernobyl Disaster 1986: <https://www.britannica.com/video/180283/disaster-Chernobyl-video-repercussions>
15. <https://www.britannica.com/event/Fukushima-accident>

Course Outcomes

No.	Upon completion of the course, the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Gain a foundational understanding of environmental issues and analyse the efforts of the UN and the UNEP in addressing global environmental challenges.	U, An	1, 7
CO-2	Develop a comprehensive understanding of the science behind climate change, including the causes, mechanisms, and impacts on the Earth's systems.	U, Ap, An	1, 3, 7
CO3	Gain a comprehensive understanding of various forms of pollution and evaluate them at a global scale.	R, U, Ap, E	1, 2, 3, 7
CO4	Analyse the interconnectedness between biodiversity loss and its impacts on ecosystem services and planetary health.	U, Ap, E	1, 3, 7
CO5	Equip with the knowledge and skills necessary to analyse, address, and advocate for solutions to major global environmental issues.	U, An, E	1, 2, 3, 7

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Environmental Science I- Global Environmental issues

Credits: 4:0:0 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PS O	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
					ial (T)	
1.	Gain a foundational understanding of environmental issues and analyse the efforts of the UN and the UNEP in addressing global environmental challenges.	PO-1, 6, 8/ PSO-1, 7	U, An	F, C	L	-
2.	Develop a comprehensive understanding of the science behind climate change, including the causes, mechanisms, and impacts on the Earth's systems.	PO-1, 6, 8/ PSO-1, 3, 7	U, Ap, An	F, C	L	-
3.	Gain a comprehensive understanding of various forms of pollution and evaluate them at a global scale.	PO-1, 2, 6, 8/ PSO-1, 2, 3, 7	R, U, Ap, E	F, C	L	-
4.	Analyse the interconnectedness between biodiversity loss and its impacts on ecosystem services and planetary health.	PO-1, 6, 8/ PSO-1, 3, 7	U, Ap, E	F, C	L	-
5	Equip with the knowledge and skills necessary to analyse, address, and advocate for solutions to major global environmental issues.	PO-1, 2, 6, 8/ PSO-1, 2, 3, 7	U, An, E	F, C	L	-

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs

	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	1	-	-	-	-	-	2	1	-	-	-	-	2	-	3
CO 2	1	-	1	-	-	-	2	1	-	-	-	-	2	-	2
CO 3	1	1	2	-	-	-	2	1	2	-	-	-	2	-	2
CO 4	1	1	2	-	-	-	1	1	-	-	-	-	2	-	3
CO 5	1	-	1	-	-	-	1	1	2	-	-	-	2	-	2

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/Medium
3	Substantial/High

Assessment Rubrics:

Suggested Assignments (Any 2)

1. Conduct a comparative analysis of renewable energy policies and their effectiveness in different countries.
2. Propose strategies for mitigating the impact of invasive species on native biodiversity.
3. Investigate the role of fossil fuels in contributing to climate change.
4. Assess the socio-economic impacts of water scarcity in developing countries.
5. Analyse the impact of urbanisation on air quality and public health.

Continuous Comprehensive Assessment

1. Assignments
2. Seminars
3. Tests
4. PowerPoint/Poster presentations
5. Quiz/Discussion/Debate

End Semester Evaluation

1. Multiple Choice Questions
2. Very Short Answer Questions
3. Short Answer Questions
4. Essay Type Questions

Mapping of COs to Assessment Rubrics

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	-	-	✓
CO 2	✓	✓	-	✓
CO 3	✓	✓	-	✓
CO 4	✓	✓	-	✓
CO 5	✓	-	-	✓