



**Integral University, Lucknow**  
**Department of Environmental Science**

<b>Effective from Session:2023-2024</b>							
<b>Course Code</b>	<b>B150109T/ES142</b>	<b>Title of the Course</b>	Human and Environment	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	I	<b>Semester</b>	I	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b> 10+2	10+2	<b>Co-requisite</b>	NIL				
<b>Course Objectives</b>	To study about the Environment. To study Natural Resources. To study Biodiversity and Conservation. To study Environmental problems and Global and National Environmental issues. To study Human Population and Environmental Ethics.						

<b>Course Outcomes</b>	
<b>CO1</b>	Gain knowledge about environment
<b>CO2</b>	Students will learn about natural resource and its importance. Impact of human activities on natural resources.
<b>CO3</b>	Gain knowledge about the conservation of biodiversity and its importance.
<b>CO4</b>	Aware student about problem of Global and National Environmental issues.
<b>CO5</b>	Students will learn about Impact of Human Population on the Environment.

<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>	<b>Contact Hrs.</b>	<b>Mapped CO</b>
1.	Introduction to Environment	Environment, its components and segments, Multidisciplinary nature of Environmental studies Scope and Importance, Concept of Sustainability and sustainable development, SDGs	6	CO1
2.	Environmental Movements and conferences	Environmental Movements at global level, History of Environmental movements, Environmental Movements in India, National and International environmentalist, International and National summits and conferences	6	CO2
3.	Natural Resources	Energy Resources: Renewable and non-renewable energy sources, Soil erosion and desertification, Deforestation its causes and impacts, Impact of Modern Agriculture activities on Environment, Impact of Mining Activities on Environment, Water: Use and over exploitation of surface and ground water, Impacts of large Dams (Advantages and Disadvantages) Case studies.	8	CO3
4.	Ecosystem Studies	Ecosystem, Structure, Function and types, Energy flow in the Ecosystem, Food chains Food webs, Ecological Pyramid, Ecological Succession.	8	CO3
5.	Biodiversity	Biodiversity: Levels of biological diversity (Genetic, Species and Ecosystem diversity), Hot spots of biodiversity (Indian /Global), India as a Mega Diversity Nation, Threats to Biodiversity	8	CO4
6.	Environmental pollution	Environmental pollution: types, causes, effects and controls, Solid waste management (urban and industrial waste). Environmental Law	8	CO3, CO4
7.	Global and National Environmental issues	Climate change, Ozone layer depletion, acid rain and impacts on human communities and Environment. International agreements: Montreal and Kyoto protocols and convention on Biological Diversity (CBD), Tribal rights, Human wildlife conflicts in Indian context.	8	CO4, CO5
8.	Impact of Human Population on the Environment	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, case studies, Environmental ethics: Role of Indian and other religions and cultures in environmental conservation, Environmental communication and public awareness as studies.	8	CO5

**Reference Books:**

- 1) Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
- 2) Bharucha Erach, The Biodiversity of India, Mapin Pub. Pvt. Ltd., Ahmedabad-380, India.
- 3) Brunne R.C 1989. Hazardous waste incineration McGraw Hill

**e-Learning Source:**

- <https://byjus.com/biology/difference-between-environment-and-ecosystem>.  
<https://www.youtube.com/watch?v=dRPI4TB8w7k>

<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																	
<b>PO-PSO</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO5	PSO6
	<b>CO</b>																
<b>CO1</b>	1	1	1	1	1	2	2	-	-	-	-	-	1	1	1		
<b>CO2</b>	1	1	1	1	1	2	2	-	-	-	-	-	1	1	1		
<b>CO3</b>	1	1	1	1	1	2	2	-	-	-	-	-	1	1	1		
<b>CO4</b>	1	1	1	1	1	2	2	-	-	-	-	-	1	1	1		
<b>CO5</b>	1	1	1	1	1	2	2	-	-	-	-	-	1	1	1	-	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

<b>Name &amp; Sign of Program Coordinator</b>	<b>Sign &amp; Seal of HoD</b>
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**Integral University, Lucknow**  
**Department of Environmental Science**

<b>Effective from Session:</b> 2023-24							
<b>Course Code</b>	B150209T/ES141	<b>Title of the Course</b>	Introduction to Environmental Studies	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	1st	<b>Semester</b>	II	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b>	10+2	<b>Co-requisite</b>	NIL				
<b>Course Objectives</b>	To study the Environment and the Ecosystem. To study Natural Resources. To study Biodiversity and Conservation. To study Environmental pollution and management. To study Human Population and Environmental Ethics.						
<b>Course Outcomes</b>							
<b>CO1</b>	Gain knowledge about the environment and ecosystem						
<b>CO2</b>	Students will learn about natural resource, its importance and biogeochemical cycles						
<b>CO3</b>	Gain knowledge about the conservation of biodiversity and its importance.						
<b>CO4</b>	Aware students about problems of environmental pollution, its impact on humans and ecosystem and control measures and about Environmental Laws.						
<b>CO5</b>	Students will learn about increase in population growth and its impact on environment.						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mappe d CO
1	Introduction to Ecology and Environment	Concept of Ecology and Environment, components and segments of Environment, Multidisciplinary nature of Environmental Studies, Concept of Sustainability and sustainable development, and Environmental movements.	8	CO1
2	Ecosystem	Concept of Ecosystem, Structure & Functions of Ecosystem, Energy flow in the Ecosystem, Ecological Pyramids, Ecosystem services and Ecological Succession.	8	CO1
3	Biogeochemical Cycles	Concept of Gaseous and sedimentary cycles, Hydrological cycle, Carbon, Nitrogen, Oxygen, Phosphorus, and sulfur cycle.	8	CO2
4	Natural Resources	Renewable and non-renewable resources, Soil erosion and desertification, Deforestation, Water: Use and over-exploitation, Impacts of large Dams, Case studies	8	CO2
5	Biodiversity and Conservation	Levels of biological diversity, Hot spots of biodiversity, India as a Mega Diversity Nation, Endangered and endemic species of India, Threats to Biodiversity, Conservation of Biodiversity, Biodiversity services.	8	CO3
6	Environmental Pollution and Management	Environmental pollution, Solid waste management, Ill effects of fireworks, Climate change, Ozone layer depletion, acid rain and impacts on human communities and the Environment.	8	CO4
7	Environmental Laws	Environmental Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention & Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Tribal rights, Human-wildlife conflicts.	8	CO4
8	Human Population and Environment	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, Environmental ethics, Environmental communication and public awareness, case studies.	8	CO5

**Reference Books:**

- 1) Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
- 2) Bharucha Erach, The Biodiversity of India, Mapin Pub. Pvt. Ltd., Ahemdabad-380, India.
- 3) Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill
- 4) Clark R.S. Marine Pollution, Clanderon Press Oxford (TB)
- 5) Cunningham W.P.2001.Cooper, T.H. Gorhani, E & Hepworth, Environmental encyclopedia, Jaicob Publication House, Mumbai.
- 6) De. A.K. Environmental chemistry Willey Eastern Limited.
- 7) Glick, H.P.1993 water in crisis, Pacific Institute for studies in dev, Environment & security, Stockholm Env, Institute, Oxford Univ, Press 473 p.
- 8) Hawkins R. E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay.
- 9) Heywood, V.H. & Watson, R. T.1995.Global biodiversity Assessment Cambridge Univ. Press 1140 p.
- 10) Jadhve, H. and Bhosale, V. M. 1995 Environmental protection and laws, Himalaya pub, house, Delhi.284 p.
- 11) Mckinnery, M.L. and School, R. M.1996 Environmental science systems and solutions, web enhanced edition 639 p.

**e-Learning Source:**

- [https://byjus.com/biology/difference-between-environment-and-ecosystem.](https://byjus.com/biology/difference-between-environment-and-ecosystem)  
<https://www.youtube.com/watch?v=dRPI4TB8w7k>  
<https://www.youtube.com/watch?v=3fbEVtyJck>  
<https://www.vedantu.com/biology/conservation-of-biodiversity>  
<https://youmatter.world/en/definition/soil-erosion-degradation-definition/>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	2	2	1	1	1	3	1	1	1	1	2	1	1	1	-	-	-
<b>CO2</b>	1	1	1	1	1	3	1	1	1	1	1	1	1	1	-	-	-
<b>CO3</b>	1	2	1	1	1	2	1	1	1	1	2	1	1	1	-	-	-
<b>CO4</b>	1	1	1	1	1	2	1	1	1	1	2	1	1	1	-	-	-
<b>CO5</b>	1	2	1	1	2	3	2	1	2	1	2	1	1	1	-	-	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator					Sign & Seal of HoD				
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**Integral University, Lucknow**  
**Department of Environmental Science**

<b>Effective from Session: 2022-2023</b>							
<b>Course Code</b>	<b>B150409T/ES235</b>	<b>Title of the Course</b>	Introduction to Sustainable Development	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	2nd	<b>Semester</b>	IV	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b>	10+2	<b>Co-requisite</b>	NIL				
<b>Course Objectives</b>	To develop a knowledge of natural resources and its conservation. To provide knowledge of renewable and non-renewable energy resources and its management techniques.						

<b>Course Outcomes</b>	
<b>CO1</b>	Students would be able to gain the knowledge of Sustainable development Goal.
<b>CO2</b>	Students would be able to gain the knowledge how to manage the use of Natural Resources.
<b>CO3</b>	Students would be able to promote energy conservation through efficient land use planning and building design through energy conservation.
<b>CO4</b>	Students are able to understand the sustainable use of Natural and Renewable resources.
<b>CO5</b>	Students are able to encourage conservation of natural resources.

<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>	<b>Contact Hrs.</b>	<b>Mapped CO</b>
1	Introduction to Sustainable Development	Introduction to SD - its importance, need, impact and implications; definition coined; evolution of SD perspectives (MDGs AND SDGs) over the years; recent debates; 1987 Brundtland Commission and outcome; later UN summits (Rio summit, etc.) and outcome.	8	CO1
2	Natural Resources and Conservation	Forest resources: forests management strategies, sustainable forestry, water resources: renewal and use of water resources, fresh water shortages, strategies of water conservation. Soil resources: importance of soil, soil conservation strategies, food resources: world food problem, techniques to increase world food production, green revolution	8	CO2
3	Dimensions to Sustainable Development	Society, environment, culture and economy; current challenges - natural, political, socio-economic imbalance; sustainable development initiatives and policies of various countries: global, regional, national, local; needs of present and future generation - political, economic, environmental.	8	CO3
4	Non-renewable energy resources	Coal: reserves, classification, formation, extraction, processing, coal gasification. environmental impacts of nonrenewable energy consumption, impact of energy consumption on global economy, application of green technology.	6	CO2
5	Gauging Sustainable Development	Sustainability and development indicators and SDGs, UN's outlook of sustainable development and efforts, UN SDGs - structure, governance and partnerships; communities / society: ensuring resilience and primary needs in society; strengthening institutions for sustainability; shaping a sustainable economy.	8	CO1
6	Renewable energy resources	Energy efficiency, solar energy: technology, advantages, solar thermal systems, solar cells. Hydropower: technology, potential, operational costs, benefits of hydro-power development. Nuclear power: nuclear fission, fusion, reactor, storage of radioactive waste.	8	CO4
7	Resource Management	Approaches in resource management: ecological approach, economic approach, integrated resource management strategies, concept of sustainability science: sustainable energy strategy, principle of energy conservation, Indian renewable energy Programme.	8	CO4
8	Case Studies & Projects on Rural Sustainable Development	Current challenges and thematic areas; village social hierarchy; village economy; needs of present and future generation; conflicts - sustainability and rural culture & tradition; road to achieving sustainable development goals - bridging conflicts and way forward.	6	CO5

**Reference Books:**

- 1-Craig, J.R., Vaughan. D.J. & Skinner. B. J. 1996. Resources of the Earth: Origin, use and Environmental Impacts (2nd edition). Prentice Hall, New Jersey.
- 2-Freeman, A.M. 2001 . Measures of value mid Resources. Resources for the Future. Washington DC.
- 3-Ginley, D.S. & Calien, D. 20.11.Fundamentals of Materials for Energy and Environmental .
- 4-Nhamo, Godwell, and Vuyo Mjimba. Sustainable Development Goals and institutions of higher education. Springer, 2020.
- 5-Our Common Journey: A Transition Toward Sustainability. National Academy Press, Washington D.C. Soubbotina, T. P. 2004.

**e-Learning Source:**

- [https://docs.google.com/document/d/1HMF\\_BlxSbsXUkQsUuVXj\\_VibeEq\\_nu4C/edit?usp=sharing&oid=114555250431858417199&rtpof=true&sd=true](https://docs.google.com/document/d/1HMF_BlxSbsXUkQsUuVXj_VibeEq_nu4C/edit?usp=sharing&oid=114555250431858417199&rtpof=true&sd=true)
- [https://www.youtube.com/watch?v=LxHdUd\\_Q12Y](https://www.youtube.com/watch?v=LxHdUd_Q12Y)
- <https://www.youtube.com/watch?v=f14oBaPNhdc>

<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																		
<b>PO-PSO</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	2	2						-	-	-	-	-	2	2				-
<b>CO2</b>	3	2						-	-	-	-	-	2	2				-
<b>CO3</b>	2	2						-	-	-	-	-	2	2				-
<b>CO4</b>	3	2						-	-	-	-	-	2	2				-
<b>CO5</b>	2	2						-	-	-	-	-	2	2				-

**2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

<b>Name &amp; Sign of Program Coordinator</b>	<b>Sign &amp; Seal of HoD</b>
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**Integral University, Lucknow**  
**Department of Environmental Science**

<b>Effective from Session: 2023-24</b>							
<b>Course Code</b>	<b>B150410T/ES236</b>	<b>Title of the Course</b>	Disaster Risk Reduction and Management	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>2nd</b>	<b>Semester</b>	<b>IV</b>	3	1	0	4
<b>Pre-Requisite</b>	10+2	<b>Co-requisite</b>	NIL				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>To impart knowledge and concepts of disaster, disaster management and disaster risk reduction.</li> <li>To enhance the students understanding on Hazard Vulnerability and Risk Analysis</li> <li>To develop positive attitude towards practical response to different stages of disaster management by adopting advance technology and sustainable development.</li> <li>To ensure disaster response skills in assessment, analysis, intervention and evaluation in the Practice of reducing disaster risk.</li> </ul>						

<b>Course Outcomes</b>	
<b>CO1</b>	Students will be able to understand concept of Disaster, Natural Hazards and Human Induced Disasters.
<b>CO2</b>	Students will be able to understand about Disaster management Cycle
<b>CO3</b>	Students will be able to understand about Disaster intervention Practices
<b>CO4</b>	Students will be able to understand about Disaster Risk Reduction Strategies
<b>CO5</b>	Students will have practical exposure about Disaster Risk Reduction Measures

<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>	<b>Contact Hrs.</b>	<b>MappedCO</b>
1	Concepts of Disaster	History of Disasters; Disaster: Definition and concepts; Disaster Terminology - Hazard , Capacity, Vulnerability, Risk; Disasters Classification; Causes of Disaster, Impact of Disasters, Disaster and financial resilience	8	CO1
2	Natural Hazard	Types of Natural Hazards: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides, Hail Storms, Heat & Cold Waves and Avalanches. - Environmental Impacts, Outbreaks of Disease and Epidemics	8	CO1
3	Human Induced Disaster	Socio-Technical Disaster - Technological Disaster- Transportation Disaster/ Accidents- Structural Collapse- Nuclear - Industrial and other Accidents - Oil Slicks and Spills -War, Pollution - air, water, industrial pollution, Terrorist attack and Conflicts	6	CO1
4	Vulnerability	Concept of Vulnerability, Disaster vulnerability profile of India - Specific to geographical regions and states (as per regional significance), Types of Vulnerability	6	CO1
5	Disaster Management Cycle	Disaster Management Cycle: Phases of disasters, Preparedness, mitigation, Response, rehabilitation, reconstruction, Rescue and relief, Compensation and insurance	8	CO2
6	Disasters Intervention Practices	Disaster risk reduction (DRR) - Community based DRR, Institutions concerned with safety, Disaster mitigation and construction techniques as per Indian Standard -Early warning systems, Trauma and Stress management, First-aid and emergency procedures -Awareness generation strategies for the community on safe practices in disaster (as per regional significance)	8	CO3
7	Disaster risk reduction strategies	Institutional framework of disaster management in India (NDMA-SDMA-DDMA, NDRF, Civic volunteers, NIDM), Disaster risk reduction strategies and National Disaster Management Guidelines; National Policy on Disaster Management 2009, Disaster Management Act-2005; Applications of remote sensing & GIS in disaster management	8	CO4
8	Planning & Implementation	Vulnerability Mapping, Safe community planning and implementation, Mock Drills, Land Use Planning	8	CO5

**Reference Books:**

- Singh, R. (2017), "Disaster Management Guidelines for Earthquakes, Landslides, Avalanches and Tsunami". Horizon Press Publications
- Singh, R. (2016), "Disaster Management Guidelines for Natural Disasters" Oxford University Press Pvt. Ltd.
- Taimpo (2016), " Disaster Management and Preparedness" CRC Press Publications
- Nidhi, G. D. (2014), "Disaster Management Preparedness". CBS Publications Pvt. Ltd.

**e-Learning Source:**

- [https://www.google.co.in/url?sa=t&rc=1&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiOmvKO7fP\\_AhWC3TgGHRKTCjgQFnoECCEQAQ&url=https%3A%2F%2Flearning.nidm.gov.in%2F&usq=AOvVaw1fHRBrqPNiZM9hjZrUGaY&opi=89978449](https://www.google.co.in/url?sa=t&rc=1&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiOmvKO7fP_AhWC3TgGHRKTCjgQFnoECCEQAQ&url=https%3A%2F%2Flearning.nidm.gov.in%2F&usq=AOvVaw1fHRBrqPNiZM9hjZrUGaY&opi=89978449)
- <https://www.gfdrr.org/en/self-paced-e-learning>

<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																		
<b>PO-PSO</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
<b>CO1</b>	2	3	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
<b>CO2</b>	2	3	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
<b>CO3</b>	2	3	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-
<b>CO4</b>	2	3	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
<b>CO5</b>	2	3	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

<b>Name &amp; Sign of Program Coordinator</b>	<b>Sign &amp; Seal of HoD</b>
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**Integral University, Lucknow**  
**Department of Environmental Science**

<b>Effective from Session: 2023-24</b>							
<b>Course Code</b>	<b>B150508T/ES427</b>	<b>Title of the Course</b>	Hydrology and Water Resources	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>4th</b>	<b>Semester</b>	VIII	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b>	10+2	<b>Co-requisite</b>	NII				
<b>Course Objectives</b>	The course introduces the student to the hydrologic cycle and various characteristics of surface and groundwater resources including different techniques of water management. It also introduces them to basic analytical methods to quantify water quality and determine hydrological parameters.						
<b>Course Outcomes</b>							
<b>CO1</b>	Develop an in-depth understanding on the hydrologic cycle and various characteristics of surface and groundwater resources including different techniques of water management.						
<b>CO2</b>	Enable to estimate physico-chemical properties of water and evaluate hydrologic parameters; catchment delineation and water balance.						
<b>CO3</b>	Trains on basic analytical methods to quantify water quality, analyze hydrographs and determine hydrological parameters						
<b>CO4</b>	Groundwater monitoring, watershed management system						
<b>CO5</b>	Applications of groundwater in various purposes, river action plans						
<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>				<b>Contact Hrs.</b>	<b>Mapped CO</b>
1	An Introduction to Hydrology	The hydrologic cycle; Structure and properties of water, Inventory of Earth's water, quality and quantity. Distribution of water - local, regional and global. Limits of cations and anions in portable water including fluoride and arsenic, phosphate, nitrate and heavy metals. Hydrogeology of India.				8	CO1
2	Surface water resources	precipitation, infiltration, water balance, Evapo-transpiration and runoff, Drainage basin. Stream discharge parameters and its measurement, River Hydrographs, Stage-discharge relationship and rating curves. Surface water and ground water interaction.				8	CO2
3	Groundwater resources	classification of formations according to their groundwater bearing properties. Vertical distribution of subsurface water: zone of aeration and saturation. Geologic formations as aquifers. Types of aquifers.				6	CO2
4	Factors affecting groundwater potentiality	Rock properties affecting groundwater and aquifer parameters: porosity, permeability, hydraulic conductivity, transmissivity, and storage coefficient. Darcy's law and the viscous character of groundwater flow. Ground water exploration.				8	CO3
5	Environmental Influences on water resources	surface and groundwater resources of arid and semiarid regions. Snowmelt hydrology from glaciers. Groundwater level fluctuations due to urbanization, evapo-transpiration, meteorological phenomena and tides.				6	CO3
6	Water resource monitoring	Recent development in surface and groundwater resources monitoring and assessment. Salinity ingress in ground water. Water logging and soil salinity-conjunctive use of surface water and ground water				8	CO4
7	Water resource management	Flood and floodplain management; Water-shed management, water harvesting and artificial recharge to ground water; water pollution and water treatment. Wetland and riparian management; forest management on water resources.				8	CO4
8	Application of isotopes in hydrology	Environmental issues: River linking debate, Water resources management in the perspective of possible climate change.				8	CO5
<b>Reference Books:</b>							
Aggarwal, A. 199. Floods, Floodplains and Environmental Myths. Centre for Science and Environment, New Delhi							
Ward, A.D. and Stanley, T. 2004. Environmental Hydrology, 2nd Ed., Lewis Publishers							
Grumbine, R.E. and Pandit, M.K. 2013. Threats from India's Himalaya dams. <i>Science</i> , 339:36-37.							
Timothy, D. 2003. Fundamentals of Hydrology. Taylor and Francis, U.K.							
Todd, D.K. 2004. Groundwater Hydrology, John Wiley & Sons Inc.							
Wright, R.T and Nebel, B.J. 2002. Environmental Science: toward a sustainable future, Prentice Hall India Ltd, 8th Edition.							
<b>e-Learning Source:</b>							
<a href="https://www.usgs.gov">https://www.usgs.gov</a>							
<a href="https://www.mdpi.com">https://www.mdpi.com</a>							
<a href="https://www.sciencedirect.com">https://www.sciencedirect.com</a>							

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO1	3	1	2	1	2	2	2	-	-	-	-	-	3	1	2	1	1
CO2	3	2	1	1	2	2	2	-	-	-	-	-	3	1	1	1	1	-
CO3	2	1	1	3	2	1	2	-	-	-	-	-	3	1	1	1	1	-
CO4	1	1	1	2	1	2	2	-	-	-	-	-	3	1	1	1	1	-
CO5	1	1	2	2	1	2	2	-	-	-	-	-	3	1	1	1	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD
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**Integral University, Lucknow**  
**Department of Environmental Science**

**Effective from Session: 2023-24**

<b>Course Code</b>	<b>B150509T/ES428</b>	<b>Title of the Course</b>	Environmental Ethics	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>4th</b>	<b>Semester</b>	VIII	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b>	10+2	<b>Co-requisite</b>	NII				
<b>Course Objectives</b>	The main objective of this course will be to familiarize the students with the broad theories and parameters of environmental philosophy, including issues of animal rights, human rights and wilderness ideas.						

**Course Outcomes**

<b>CO1</b>	Have an enhanced knowledge of Environmental Ethics and its impact on the environment.
<b>CO2</b>	Be able to explain eco centric Theories of Nature,
<b>CO3</b>	Be able to explain Environment and Business Ethics and sustainable development.
<b>CO4</b>	Be able to explain Environmental Ethical issues of National and International Governance.
<b>CO5</b>	Be able to describe the Environment conservation ethics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	An Introduction to Environmental Ethics	Ethics in society; Environmental Consequences; Responsibility for Environmental Degradation	8	CO1
2	Theories of Environmental Ethics	Different types of schools of thought vis-à-vis nature and environmental management. Values in modernity, anti-modernity, eastern and western cultures, nature and religion etc.	8	CO1
3	Eco Centric Theories of Nature	Deep ecology and animal rights theories, environmental rights, environmental racism.	8	CO2
4	Cross-cultural views on Nature	The relationship between humans, nature and adaptation. Theoretical frameworks of cultural and social ecology; debates on culture/nature divide.	8	CO2
5	Environment and Business Ethics	Foundations of Environmental Ethics for Business, Corporate Environmental Ethics, Environmental Disclosure, Social and Ethical Issues for Sustainable Development, Business Ethics and Corporate Environmental Performance.	8	CO3
6	Environmental Ethics and Issues of National and International Governance	Changing nature of environmental ethics in relation to international and national paradigms of environmental governance.	6	CO4
7	The ethical basis of Environmental awareness program	Environmental awareness program: Agricultural, Air Quality, Energy Efficiency and Global Climate Change, Pollution Prevention, Product Labeling, Technology, Transportation and Waste Management Programs.	8	CO4
8	The Environment conservation ethics	Basic principles of environmental ethics: Justice and sustainability, Sufficiency and compassion, Solidarity and participation.	6	CO5

**Reference Books:**

Cooper, D.E. & Palmer. J.A. (Eds). 1992. The Environment in question: Ethics & Global Issues, London, Routledge.

Des Jardius, J.R. 2001. Environmental Ethics: An invitation to Environmental philosophy (3Ed.), Wadsworth Publ., Belmont, California.

Grim, J. A. 2001. Indigenous Traditions and Ecology (Ed.), Harvard University Press.

Sivaramakrishnan, K. 2015. 'Ethics of Nature in Indian Environmental History', *Modern Asian Studies*, Vol.49, No.4. pp. 1261-1310.

Traer, R. 2018. Doing Environmental Ethics. Routledge

**e-Learning Source:**

- <https://www.researchgate.net>
- <https://plato.stanford.edu>
- <https://www.slideshare.net/AniketKumar32/environmental-ethics-76634822>
- <https://www.slideshare.net/Samchuchoo/environmental-ethics-50189175>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 4	PSO 5	PSO 6	PSO 7
	<b>CO1</b>	3	1	2	1	2	2	2	-	-	-	-	-	3	1	2	1	1
<b>CO2</b>	3	2	1	1	2	2	2	-	-	-	-	-	3	1	1	1	1	-
<b>CO3</b>	2	1	1	3	2	1	2	-	-	-	-	-	3	1	1	1	1	-
<b>CO4</b>	1	1	1	2	1	2	2	-	-	-	-	-	3	1	1	1	1	-
<b>CO5</b>	1	1	2	2	1	2	2	-	-	-	-	-	3	1	1	1	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

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