

**Academic Year: 2025-26**

**Institute Name :** K. K. Wagh Polytechnic, Nashik

**Programme and Code:** Artificial Intelligence and Machine Learning(AN)

**Course Name:** Environmental Education And Sustainability

**Semester:** IV<sup>th</sup> **Scheme:** 'K' **Allocated Hrs:** 45

**Date:** 13/12/2025

**Institute Code:**0078

**Course Index:** 401

**Course Abbr. Code:** EES-314301

**Name of Faculty:** Ms.S.D.Kanke

**Class:** SYAN

● **Teaching and Examination Scheme:**

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme											
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR				
															Max	Min	Max	Min	Max	Min	
314301	Environmental Education and Sustainability	EES	VEC	3	-	-	1	4	2	1.5	30	70	100	40	-	-	-	-	25	10	125

**Abbreviations:** Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA - Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

**Legends:** @ Internal Assessment, # External Assessment, \*# On Line Examination , @\$ Internal Online Examination

- **Course Outcomes (COs) and Theory Learning Outcome(TLOs):** By learning course Environmental Education and Sustainability (EES-314301), Second Year of AIML students will be able to:

CO No.	TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
CO401.1		<b>Environment and climate change</b>
	TLO 1.1	Explain the need of studying environment and its components.
	TLO 1.2	Investigate the impact of population growth and industrialization on the relevant environmental issues and suggest remedial solutions
	TLO 1.3	Explain the Concept of 5 R w.r.t. the given situation
	TLO 1.4	Elaborate the relevance of Sustainable Development Goals in managing the climate change
	TLO 1.5	Explain the concept of zero carbon-footprint with carbon credit
CO401.2		<b>Sustainability and Renewable Resources</b>
	TLO 2.1	Justify the importance of natural resources in sustainable development
	TLO 2.2	Explain the need of optimum use of natural resources to maintain the sustainability
	TLO 2.3	Differentiate between renewable and non-renewable sources of energy
	TLO 2.4	Suggest the relevant type of energy source as a green solution to environmental issues
CO401.3		<b>Ecosystem and Biodiversity</b>
	TLO 3.1	Explain the characteristics and functions of ecosystem.
	TLO 3.2	Relate the importance of biodiversity and its loss in the environmental sustainability.
	TLO 3.3	Describe biodiversity assessment initiatives in India

	TLO 3.4	Conduct the SWOT analysis of the biodiversity hot spot in India
	TLO 3.5	Explain the need of conservation of biodiversity in the given situation
<b>CO401.4</b>		<b>Environmental Pollution</b>
	TLO 4.1	Classify the pollution based on the given criteria
	TLO 4.2	Justify the need of preserving soil as a resource along with the preservation techniques
	TLO 4.3	Maintain the quality of water in the given location using relevant preventive measures
	TLO 4.4	State the significance of controlling the air pollution to maintain its ambient quality norms
	TLO 4.5	Compare the noise level from different zones of city with justification
	TLO 4.6	Describe the roles and responsibilities of central and state pollution control board.
<b>CO401.5</b>		<b>Environmental legislation and sustainable practices</b>
	TLO 5.1	Explain Constitutional provisions related to environmental protection
	TLO 5.2	Explain importance of public participation (PPP) in enacting the relevant laws
	TLO 5.3	Use the relevant green technologies to provide sustainable solutions of an environmental problem
	TLO 5.4	Explain the role of information technology in environment protection

● **Teaching Plan:**

Unit No. (Allotted Hrs.) Marks	Theory Learning Outcomes (TLO)	Title/Topic Details and Course Outcome [CO]	Plan (From -To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Teaching Method/ Media/ Tools	Remark
01 (08) 12M	1.1	<b>Unit - I Environment and climate change (CO401.1)</b>  Environment and its components, Types of Environments, Need of environmental studies	18/12/2025 (01)		Chalk Board, PPT+ LCD	
	1.2	Environmental Issues- Climate change, Global warming, Acid rain, Ozone layer depletion, nuclear accidents. Effect of population growth and industrialization	19/12/2025 to 20/12/2025 (02)		Chalk Board, PPT+ LCD	
	1.3	Concept of 5R, Individuals' participation in i) 5R policy, ii) segregation of waste, and iii) creating manure from domestic waste	26/12/2025 to 27/12/2025 (02)		Chalk Board, PPT+ LCD	
	1.4	Impact of Climate change, Factors contributing to climate change, Concept of Sustainable development, Sustainable development Goals (SDGs), Action Plan on Climate Change in Indian perspectives	01/12/2026 to 02/01/2026 (02)		Chalk Board, PPT+ LCD MKCL ERA	

	1.5	Zero Carbon footprint for sustainable development, (IKS-Environment conservation in vedic and pre-vedic India)	03/01/2026 (01)		Chalk Board, PPT+ LCD MKCL ERA	
02 (10) 16M	2.1	<b>Unit - II Sustainability and Renewable Resources (CO401.2)</b>  Natural Resources: Types, importance, Causes and effects of depletion. (Forest Resources, Water Resources, Energy Resources, Land resources, Mineral resources), (IKS- Concepts of Panchmahabhuta)	08/01/2026 to 10/01/2026 (03)		Chalk Board, PPT +LCD	
	2.2	Impact of overexploitation of natural resources on the environment, optimum use of natural resources	15/01/2026 to 16/01/2026 (02)		Chalk Board, PPT+ LCD MKCL ERA	
	2.3	Energy forms (Renewable and non-renewable) such as Thermal energy, nuclear energy, Solar energy, Wind energy, Geothermal energy, Biomass energy, Hydropower energy, biofuel	17/01/2026 to 23/01/2026 (03)		Chalk Board, PPT+ LCD	
	2.4	Green Solutions in the form of New Energy Sources such as Hydrogen energy, Ocean energy & Tidal energy	24/01/2026 to 30/01/2026 (02)		Chalk Board, PPT+ LCD	
03 (08) 12M	3.1	<b>Unit - III Ecosystem and Biodiversity (CO401.3)</b> Ecosystem - Definition, Aspects of ecosystem, Division of ecosystem, General characteristics of ecosystem, Functions of ecosystem	31/01/2026 to 05/02/2026  (02)		Chalk Board, PPT+ LCD, Demo MKCL ERA	
	3.2	Biodiversity - Definitions, Levels, Value, and loss of biodiversity	06/02/2026 to 07/02/2026 (02)		Chalk Board, PPT+ LCD, Demo	
	3.3	Biodiversity Assessment Initiatives in India	12/02/2026 (01)		Chalk Board, PPT+ LCD, Demo	
	3.4	SWOT analysis of biodiversity hot spot in India	13/02/2026 to 14/02/2026 (02)		Chalk Board, PPT+ LCD	
	3.5	Conservations of biodiversity - objects, and laws for conservation of biodiversity	20/02/2026 (01)		Chalk Board, PPT+ LCD	

04 (12) 18M	4.1	<b>Unit - IV Environmental Pollution(CO401.4)</b> Definition of pollution, types- Natural & Artificial (Man-made)	21/02/2026 (01)		Chalk Board, PPT+ LCD, Demo MKCL ERA
	4.2	Soil / Land Pollution – Need of preservation of soil resource, Causes and effects on environment and lives, preventive measures, Soil conservation	26/02/2026 to 28/02/2026 (03)		Chalk Board, PPT+ LCD, Demo
	4.3	Water Pollution - sources of water pollution, effects on environment and lives, preventive measures, BIS water quality standards for domestic potable water, water conservation	05/03/2026 to 06/03/2026 (02)		Chalk Board, PPT+ LCD, Demo
	4.4	Air pollution - Causes, effects, prevention, CPCB norms of ambient air quality in residential area	07/03/2026 to 12/03/2026 (02)		Chalk Board, PPT+ LCD, Demo
	4.5	Noise pollution - Sources, effects, prevention, noise levels at various zones of the city	13/03/2026 to 14/03/2026 (02)		Chalk Board, PPT+ LCD, Demo
	4.6	Pollution Control Boards at Central and State Government level: Norms, Roles and Responsibilities	20/03/2026 to 21/03/2026 (02)		Chalk Board, PPT+ LCD, Demo
05 (07) 12M	5.1	<b>Unit - V Environmental legislation and sustainable practices (CO401.5)</b> Article (48-A) and (51-A (g)) of Indian Constitution regarding environment, Environmental protection and prevention acts	26/03/2026 to 27/03/2026 (02)		Chalk Board, PPT+ LCD, Demo
	5.2	Public awareness about environment. Need of public awareness and individuals' participation. Role of NGOs	28/03/2026 (01)		Chalk Board, PPT+ LCD, MKCL ERA
	5.3	Green technologies like solar desalination, green architecture, vertical farming and hydroponics, electric vehicles, plant-based packaging	28/03/2026 to 02/04/2026 (02)		Chalk Board, PPT+ LCD, MKCL ERA
	5.4	Role of information technology in environment protection and human health	03/04/2026 to 04/04/2026 (02)		Chalk Board, PPT+ LCD, MKCL ERA

● **COs - POs MATRIX FORM:**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	-	1	-	-	3	2	3			
CO2	-	2	2	-	3	2	3			
CO3	-	-	-	-	3	1	2			
CO4	1	-	-	-	3	2	2			
CO5	1	-	2	-	3	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -

**PSO1:** Apply fundamental concepts of Computer Engineering and Artificial Intelligence and machine Learning to solve technical problems.

**PSO2:** Implement the domain knowledge to achieve successful career as an engineering professional.

● **SELF LEARNING ACTIVITY (SLA) ASSESSMENT CRITERIA:**

Self learning activity out of Microproject/UNICEF Certification/ Assignment will be performed by students.

It will be assessed for 25 Marks under Self Learning Activity (SLA).

**Suggested Self Learning Activities:**

**1. Assignment**

- I. Suggest the steps to implement (or improve the implementation) of the 5R policy in your home/institute stating your contribution.
- II. Draft an article on India's Strategies to progress across the Sustainable Development Goals.
- III. Make a chart of Renewable and non-renewable energy sources mentioning the advantages and disadvantages of each source.
- IV. Conduct the SWOT analysis of biodiversity hotspot in India.
- V. Prepare a mind-mapping for the zero carbon footprint process of your field.
- VI. Prepare a chart showing sources of pollution (air/water/ soil), its effect on human beings, and remedial actions Any other assignment on relevant topic related to the course suggested by the facilitator.

**2. UNICEF Certification(s)**

Students may complete the self-paced course launched by Youth Leadership for climate Exchange under UNICEF program on portal [www.mahayouthnet.in](http://www.mahayouthnet.in) . The course encompasses five Modules in the form of Units as given below: -

Unit 1: Living with climate change

Unit 2 : Water Management and Climate Action

Unit 3: Energy Management and Climate Action

Unit 4 : Waste Management and Climate Action

Unit 5 : Bio-cultural Diversity and Climate Action

If students complete all the five Units they are not required to undertake any other assignment

/Microproject/activities specified in the course. These units will suffice to their evaluations under SLA component

**3. Micro project**

- I. Technical analysis of nearby commercial RO plant.
- II. Comparative study of different filters used in Household water filtration unit.

- III. Evaluate any nearby biogas plant /vermicomposting plant or any such composting unit on the basis of sustainability and cost-benefit.
- IV. IKS-Study and prepare a note on Vedic and Pre-Vedic techniques of environmental conversion.

Visit a local polluted water source and make a report mentioning causes of pollution  
Any other activity / relevant topic related to the course suggested by the facilitator.

### ● Activities

1. Prepare a report on the working and functions of the PUC Center machines and its relevance in pollution control & prepare and analyse a case study on any polluted city of India.
  2. Prepare a note based on the field visit to the solid waste management department of the municipal corporation / local authority.
  3. Record the biodiversity of your institute/garden in your city mentioning types of vegetation and their numbers Visit any functional hall/cultural hall /community hall to study the disposal techniques of kitchen waste and prepare a report 4. Suggesting sustainable waste management tool.
- Watch a video related to air pollution in India and present the summary.  
Any other assignment on relevant topic related to the course suggested by the facilitator.

### ● ASSESSMENT METHODOLOGIES/TOOLS

#### Formative Assessment (Assessment for Learning)

- Two-unit test(MCQs) of 30 marks will be conducted and average of two-unit test considered.  
Formative assessment of self learning of 25 marks should be assessed based on self learning activity such as UNICEF Certifications/ Microproject /Assignment/Activities. (60% weightage to process and 40% to product).

#### Summative Assessment (Assessment for Learning)

- Online MCQ type Exam of the weightage 70 marks.

### ● References:

#### A. Books:

Sr.No	Author	Title	Publisher with ISBN Number
1	Y. K. Singh	Environmental Science	New Age International Publishers, 2006, ISBN: 81- 224-2330-2
2	Erach Bharucha	Environmental Studies	University Grants Commission, New Delhi
3	Rajagopalan R.	Environmental Studies: From Crisis to Cure.	Oxford University Press, USA, ISBN: 9780199459759, 0199459754
4	Shashi Chawla	A text book of Environmental Science	Tata Mc Graw-Hill New Delhi
5	Arvind Kumar	A Text Book of Environmental science	APH Publishing New Delhi (ISBN 978-8176485906)
6	N. Arumugam & V. Kumaresan	A Text Book of Environmental Studies	Saras Publication, ISBN: 978-9386519368
7	Daniel B. Botkin & Edward A. Keller	Environmental Science: Earth as a Living Planet	John Wiley & Sons, ISBN-13: 978-1118427323

**B. Web sites :**

Sr.No	Link / Portal	Description
1	<a href="https://sdgs.un.org/goals">https://sdgs.un.org/goals</a>	United Nation's website mentioning Sustainability goals
2	<a href="http://www.greenbeltmovement.org/news-and-events/blog">http://www.greenbeltmovement.org/news-and-events/blog</a>	Green Belt Movement Blogs on various climatic changes and other issues
3	<a href="http://www.greenbeltmovement.org/what-we-do/tree-planting-for-watersheds">http://www.greenbeltmovement.org/what-we-do/tree-planting-for-watersheds</a>	Green Belt Movement's work on tree plantation, soil conservation and watershed management techniques
4	<a href="https://www.youtube.com/@ierekcompany/videos">https://www.youtube.com/@ierekcompany/videos</a>	International Experts For Research Enrichment and Knowledge Exchange – IEREK's platform to exchange the knowledge in fields such as architecture, urban planning, sustainability
5	<a href="http://www.mahayouthnet.in">www.mahayouthnet.in</a>	UNICEF Initiative for youth leadership for climate action
6	<a href="https://eepmoefcc.nic.in/index1.aspx?lsid=297&amp;lev=2&amp;lid=1180&amp;langid=1">https://eepmoefcc.nic.in/index1.aspx?lsid=297&amp;lev=2&amp;lid=1180&amp;langid=1</a>	GOI Website for public awareness on environmental issues
7	<a href="https://egyankosh.ac.in/handle/123456789/61136">https://egyankosh.ac.in/handle/123456789/61136</a>	IGNOU's Initiative for online study material on Environmental studies
8	<a href="https://egyankosh.ac.in/handle/123456789/50898">https://egyankosh.ac.in/handle/123456789/50898</a>	IGNOU's Initiative for online study material on sustainability
9	<a href="https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf">https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf</a>	Final list of proposed Sustainable Development Goal indicators
10	<a href="https://sustainabledevelopment.un.org/memberstates/india">https://sustainabledevelopment.un.org/memberstates/india</a>	India's Strategies to progress across the SDGs.
11	<a href="https://www.un.org/en/development/desa/financial-crisis/sustainable-development.html">https://www.un.org/en/development/desa/financial-crisis/sustainable-development.html</a>	Challenges to Sustainable Development
12	<a href="https://nptel.ac.in/courses/109105190">https://nptel.ac.in/courses/109105190</a>	NPTEL course on sustainable development
13	<a href="https://onlinecourses.swayam2.ac.in/cec19_bt03/preview">https://onlinecourses.swayam2.ac.in/cec19_bt03/preview</a>	Swayam Course on Environmental studies (Natural Resources, Biodiversity and other topics)
14	<a href="https://onlinecourses.nptel.ac.in/noc23_hs155/preview">https://onlinecourses.nptel.ac.in/noc23_hs155/preview</a>	NPTEL course on environmental studies which encompasses SDGs, Pollution, Climate issues, Energy, Policies and legal framework
15	<a href="https://www.cbd.int/development/meetings/egmbpd/SWOT-analysis-en.pdf">https://www.cbd.int/development/meetings/egmbpd/SWOT-analysis-en.pdf</a>	SWOT analysis of Biodiversity
16	<a href="https://www.sanskrit.nic.in/SVimarsha/V2/c17.pdf">https://www.sanskrit.nic.in/SVimarsha/V2/c17.pdf</a>	Central Sanskrit University publication on Vedic and pre Vedic environmental conservation

**C. Tools :**

1. Google Classroom to share subject material to students.
2. Quizzes using MKCL ERA LMS login

Ms.S.D.Kanke  
(Name & signature of Staff)

Mrs.R.Y.Thombare  
(Name & signature of HOD)

Cc: Course File – EES(314301)