

ABOUT THE COURSE:

TOTAL DURATION :	50HRS
MODE OF DELIVERY	VIRTUAL INSTRUCTOR LED TRAINING
TRAINER TO STUDENT RATIO:	1:50
TOTAL MARKS:	75

TABLE 1

OVERALL COURSE OBJECTIVE:	To equip students with foundational skills in sustainability, artificial intelligence (AI), and Python programming, enabling them to apply AI techniques and ethical frameworks to address critical sustainability challenges such as energy efficiency, urban planning, climate modelling, and resource management. The program emphasizes practical, hands-on learning to foster problem-solving, analytical thinking, and ethical decision-making for sustainable development.
LEARNING OUTCOME:	<p>Foundational Knowledge: Understand key principles of sustainability and the role of AI in addressing global challenges.</p> <p>Technical Proficiency: Gain foundational skills in Python programming, data analysis, and data visualization, MS Excel for AI.</p> <p>AI and Machine Learning Basics: Learn core concepts of machine learning, deep learning, and generative AI, with practical applications.</p> <p>Sustainability Applications: Apply AI techniques to solve sustainability challenges in energy, agriculture, urban planning, and resource management.</p>

TABLE 2: MODULE-WISE COURSE CONTENT AND OUTCOME

SL. NO	MODULE NAME	MODULE CONTENT	MODULE LEARNING OUTCOME	DURATION (HRS)
1	Foundation of Green Skilling, Sustainability and AI Contribution	Green skilling and Sustainability	Understand the core principles of sustainability and its relevance to various industries.	4

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2	Data & MS Excel for AI Python Programming for Green Skilling and Sustainability	Data Science for Applied Sciences Data Visualization using MS Excel Introduction to Python Python Syntax Data Manipulation and Analysis - Working with Data Data Visualization	Understanding Data & its types Data Science for Applied Sciences Using MS Excel for Creating plots, charts, and graphs.	13
3	Data Visualization using Python	Matplotlib Library: Creating plots, charts, and graphs.	Understanding Matplotlib & uses with Data Understanding Plots and charts Data Transformation	4
4	Machine Learning	Introduction to Machine Learning Supervised Learning Unsupervised Learning	Understand the fundamentals of machine learning (ML) and differentiate between supervised and unsupervised learning. Build and evaluate basic supervised and unsupervised ML models using Python.	8
5	Deep Learning	Introduction to Deep Learning Deep Learning Frameworks and Libraries Core Deep Learning Techniques	Gain an introductory understanding of deep learning concepts, frameworks, and core techniques.	6
6	Image Processing using Teachable	Introduction to Computer Vision	What is Image Processing? Applications of	2

	Machines		computer vision with Green Technology and Sustainability	
7	Generative AI	Introduction to Generative AI Generative Models and Techniques	Explore applications of deep learning in computer vision and generative AI models.	4
8	AI Ethics, Fairness, and Sustainability	Introduction to AI Ethics, Fairness, and Sustainability AI Ethics: Fundamental Principles AI Fairness: Addressing Bias and Inequality Ethical Challenges in AI Deployment for Sustainability Regulatory and Policy Frameworks for Ethical AI Future Trends in AI Ethics, Fairness, and Sustainability	Understand the fundamental principles of AI ethics and their significance in sustainable development. Identify and address issues related to AI bias, fairness, and inequality. Evaluate regulatory and policy frameworks for the ethical deployment of AI in sustainability contexts.	4

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES			
LEARNING OUTCOME	ASSESSMENT CRITERIA	PERFORMANCE CRITERIA	USECASES
Understand sustainability principles and their applications in solving real-world	Analyze environmental challenges and identify sustainable	Evaluate the impact of sustainability practices using	Use Case 1: Renewable Energy Optimization Scenario: A

challenges.	solutions. Demonstrate knowledge of sustainable practices in energy efficiency, agriculture, and urban planning.	quantitative and qualitative measures. Propose innovative, AI-driven solutions for addressing sustainability challenges. Showcase effective communication of sustainability concepts through presentations or reports.	<p>manufacturing company wants to optimize its energy consumption by integrating solar energy into its operations.</p> <p>Task: Students must analyze the company's energy requirements, evaluate solar power feasibility, and recommend an efficient energy integration plan.</p>
Acquire programming skills in Python and Excel for data manipulation, analysis, and visualization.	Write Python scripts to solve real-world data problems. Perform data preprocessing, cleaning, and analysis using Excel. Create visualizations using tools like Matplotlib or Seaborn to derive insights.	Develop accurate and efficient Python scripts to handle diverse datasets. Apply data analysis techniques to identify trends and patterns using Excel. Effectively communicate findings through well-designed visualizations.	<p>Use Case 2: Analyzing Climate Change Data</p> <p>Scenario: Students are provided with global temperature and CO2 emission datasets to analyze climate trends over the past 50 years.</p> <p>Task: Use Excel to clean the data, calculate trends, and create visualizations that highlight the impact of CO2 emissions on global warming.</p>
Apply machine learning and deep learning techniques	Build basic supervised and	Develop ML/DL models with	Use Case 3: Predicting Solar

<p>to solve practical problems.</p>	<p>unsupervised machine learning models. Implement deep learning models using frameworks like TensorFlow or PyTorch.</p>	<p>high accuracy and efficiency. Demonstrate understanding of deep learning frameworks by building functional neural networks.</p>	<p>Power Generation</p> <p>Scenario: An energy company needs a model to predict solar power output based on weather data.</p> <p>Task: Students must preprocess the data, build a machine learning model, and predict solar power output based on temperature, sunlight hours, and humidity.</p>
<p>Understand and apply AI ethical principles to ensure fairness and sustainability.</p>	<p>Identify ethical challenges in AI deployment. Evaluate regulatory frameworks and ensure compliance with AI ethics standards.</p>	<p>Analyze potential biases in AI models and suggest mitigation strategies. Demonstrate adherence to ethical and professional conduct in handling sensitive data. Propose sustainable AI solutions while ensuring fairness and inclusivity.</p>	<p>Use Case 4: Ethical AI in Waste Management</p> <p>Scenario: A municipality uses AI to classify waste for recycling but faces challenges related to bias in AI decision-making.</p> <p>Task: Students must evaluate the AI system, identify biases, and propose solutions to improve fairness and efficiency while ensuring adherence to ethical standards.</p>

<p>TABLE 4: LIST OF FINAL PROJECTS (PROJECTS THAT COMPREHENSIVELY COVER ALL THE LEARNING OUTCOME)</p>	
<p>SL. NO.</p>	<p>FINAL PROJECT</p>

1	Predicting Solar Power Output Using MS-Excel
2	To create the Classifying Waste Types for Recycling (to classify them into different categories: Plastic, Metal, Organic, etc) using classification algorithms
3	Clustering Energy Consumption Patterns for Smart Cities
4	To create the Feedforward Neural Network (FNN) using TensorFlow and Keras to predict climate data.
5	To develop a CNN model to classify images of plastic waste into different categories
6	Forest Fire Detection Using Satellite Imagery
7	Waste Sorting Using Computer Vision
8	Predict air quality levels based on historical data and weather
9	Optimize the integration of predicted solar and wind energy into the power grid.
10	Understanding the Gen AI Application (chat GPT), and other Gen AI Applications

TABLE 5: COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 75)				
ASSESSMENT CRITERIA	DESCRIBE THE CRITERIA OF THE BELOW CATEGORY PERFORMANCE			TOTAL MARKS
	FAIR	GOOD	EXCELLENT	
1	33	50	75	75

Category	Assessment Criteria	Performance Levels	Weightage (Marks)
Practical Skills Proficiency	Demonstrates ability to perform job-specific tasks effectively, using relevant tools, techniques, or methodologies	Fair, Good, Excellent	20
Technical Knowledge Application	Applies theoretical concepts to practical scenarios with accuracy and relevance	Fair, Good, Excellent	15
Project Execution	Completes assigned projects or use cases demonstrating innovation, thoroughness, and skill application relevant to industry standards.	Fair, Good, Excellent	30
Communication and Reporting	Clearly presents findings, solutions, or project outcomes using professional communication and documentation standards (e.g., reports, presentations).	Fair, Good, Excellent	10