

ABOUT THE COURSE:

TOTAL DURATION:	130HRS
MODE OF DELIVERY	PHYSICAL CLASSROOM + VIRTUAL INSTRUCTOR LED TRAINING AT RESPECTIVE COLLEGES
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 and Power BI tool</p> <p>AI and Machine Learning Basics: Learn core concepts of machine learning, deep learning, and generative AI, with practical applications.</p> <p>Ethical Awareness: Understand AI ethics, fairness, and regulatory frameworks to ensure responsible AI deployment.</p> <p>Sustainability Applications: Apply AI techniques to solve sustainability challenges in energy, agriculture, urban planning, and resource management.</p> <p>Practical Problem-Solving: Develop critical thinking and collaborative skills through hands-on projects and real-world case studies.</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 Contributions	Green skilling and Sustainability Sustainability and Artificial Intelligence Contributions	Understand the core principles of sustainability and its relevance to various industries. Analyze how Artificial Intelligence (AI) can contribute to solving sustainability challenges. Evaluate real-world applications of sustainability in areas like energy efficiency, urban planning, and agriculture.	14
2	Data Science for Applied Sciences	Data Science for Applied Sciences Data Visualization using MS Excel and GPT Excel Introduction to Python Python Syntax and Fundamentals OOP's Data Manipulation and Analysis - Working with Data Data Visualization	Develop proficiency in Python syntax, data types, and programming fundamentals. Implement Object-Oriented Programming (OOP) concepts to create structured and reusable code. Apply Python for data manipulation, analysis, and visualization using libraries like Pandas	23

3	Data Visualization using Python	Data Visualization using Python	Matplotlib Library: Creating plots, charts, and graphs.	2.5
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.	14
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.	10
6	Image Processing	Image Processing using teachable machine	What is Image Processing? Applications of computer vision with Green Technology and Sustainability.	2
7	Natural Language Processing	Understanding Natural Language Processing Applications of Natural Language Processing	Basics of NLP Text to Speech Classification Speech to Text Classification	2.5

			Text Summarization Sentiment Analysis Smart Home automation using Machine Learning for kids	
8	Generative AI	Introduction to Generative AI Generative Models and Techniques	Explore applications of deep learning in computer vision and generative AI models.	4.5
9	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. Explore future trends and challenges in AI ethics and sustainability to anticipate evolving industry needs.	7.5

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT

CRITERIA AND USECASES			
LEARNING OUTCOME	ASSESSMENT CRITERIA	PERFORMANCE CRITERIA	USECASES
<ul style="list-style-type: none"> Understand sustainability principles and their applications in solving real-world challenges. 	<p>Analyze environmental challenges and identify sustainable solutions. Demonstrate knowledge of sustainable practices in energy efficiency, agriculture, and urban planning.</p>	<p>Evaluate the impact of sustainability practices using quantitative and qualitative measures. Propose innovative, AI-driven solutions for addressing sustainability challenges. Showcase effective communication of sustainability concepts through presentations or reports.</p>	<p>Use Case 1: Renewable Energy Optimization</p> <ul style="list-style-type: none"> Scenario: A manufacturing company wants to optimize its energy consumption by integrating solar energy into its operations. Task: Students must analyze the company's energy requirements, evaluate solar power feasibility, and recommend an efficient energy integration plan.
<ul style="list-style-type: none"> Acquire programming skills in Python for data manipulation, analysis, and visualization. 	<p>Write Python scripts to solve real-world data problems. Perform data preprocessing, cleaning, and analysis using libraries like Pandas. Create visualizations using tools</p>	<p>Develop accurate and efficient Python scripts to handle diverse datasets. Apply data analysis techniques to identify trends and patterns. Effectively</p>	<p>Use Case 2: Analyzing Climate Change Data</p> <ul style="list-style-type: none"> Scenario: Students are provided with global temperature and CO2 emission datasets to analyze climate trends over the past 50 years. Task: Use

	like Matplotlib or Seaborn to derive insights.	communicate findings through well-designed visualizations .	Python to clean the data, calculate trends, and create visualizations that highlight the impact of CO2 emissions on global warming.
<ul style="list-style-type: none"> Apply machine learning and deep learning techniques to solve practical problems. 	Build basic supervised and unsupervised machine learning models. Implement deep learning models using frameworks like TensorFlow or PyTorch.	Develop ML/DL models with high accuracy and efficiency. Interpret model outputs and evaluate performance using metrics like accuracy or precision. Demonstrate understanding of deep learning frameworks by building functional neural networks.	<p>Use Case 3: Predicting Solar Power Generation</p> <ul style="list-style-type: none"> Scenario: An energy company needs a model to predict solar power output based on weather data. Task: Students must preprocess the data, build a machine learning model, and predict solar power output based on temperature, sunlight hours, and humidity.
<ul style="list-style-type: none"> Understand and apply AI ethical principles to ensure fairness and sustainability. 	Identify ethical challenges in AI deployment. Evaluate regulatory frameworks and ensure compliance	Analyze potential biases in AI models and suggest mitigation strategies. Demonstrate adherence to ethical and	<p>Use Case 4: Ethical AI in Waste Management</p> <ul style="list-style-type: none"> Scenario: A municipality uses AI to classify waste for recycling but faces challenges

	with AI ethics standards.	professional conduct in handling sensitive data. Propose sustainable AI solutions while ensuring fairness and inclusivity.	related to bias in AI decision-making. <ul style="list-style-type: none"> • Task: Students must evaluate the AI system, identify biases, and propose solutions to improve fairness and efficiency while ensuring adherence to ethical standards.
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TABLE 4: LIST OF FINAL PROJECTS (15 PROJECTS THAT COMPREHENSIVELY COVER ALL THE LEARNING OUTCOME)	
SL.NO	FINAL PROJECT
1	Predicting Solar Power Output Using Linear Regression
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	To create the Waste Management Forecasting Using RNN
7	Forest Fire Detection Using Satellite Imagery
8	Waste Sorting Using Computer Vision
9	Predict air quality levels based on historical data and weather
10	Text to speech using MIT app Inventor
11	Speech to Text Classification using MIT App inventor
12	Sentiment Analysis using Machine learning for kids
13	Optimize the integration of predicted solar and wind energy into the power grid.
14	Understanding the Gen AI Application (chat GPT), and other Gen AI Applications
15	Simulating Energy-Efficient Architecture Designs with GANs

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