ABOUT THE COURSE:

TOTAL DURATION:	45 HRS
MODE OF DELIVERY	Virtual Instructor led by Industry Experts + Physical Session conducted by FDP faculty
TRAINER TO STUDENT RATIO:	1:60
TOTAL MARKS:	75

TABLE 1	
OVERALL COURSE OBJECTIVE:	• Analyze the interconnections between sustainability challenges (e.g., energy efficiency, urban planning, climate modeling) and the role of artificial intelligence in addressing them. • Evaluate the ethical implications of using AI technologies for sustainable development, applying relevant ethical frameworks in real-world contexts. • Apply foundational knowledge in Python programming and AI to design practical solutions for sustainability issues. • Create data-driven models and AI-based tools that contribute to sustainable practices in areas like resource management and climate resilience. • Develop critical problem-solving and analytical thinking skills through hands-on, project-based learning experiences focused on sustainability and emerging technologies.

LEARNING OUTCOME:	• Learners will be able to analyse sustainability challenges—such as climate modeling, urban planning, and energy efficiency—and identify how artificial intelligence can be leveraged to address them effectively. • Learners will be able to evaluate AI-based solutions through ethical lenses, considering the broader societal and environmental impacts of technological interventions in sustainable development.

	• Learners will be able to apply foundational knowledge of Python and AI techniques to implement basic solutions for sustainability problems in simulated and real-world scenarios. • Learners will be able to design and develop innovative AI tools or models for solving complex sustainability issues, integrating data analysis, programming, and ethical reasoning. • Learners will be able to demonstrate problem-solving and analytical thinking by working on hands-on projects that involve collecting data, building models, and interpreting results for sustainable impact.

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	**Analyze** the core principles of sustainability and **evaluate** their relevance across diverse industries and sectors.	4
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	**Classify and distinguish** different types of data by **analysing** their characteristics and potential applications in real-world scenarios. **Apply** data science techniques to solve practical problems in	13

		Data Manipulation and Analysis - Working with Data Data Visualization	applied sciences, integrating domain-specific knowledge.	
3	Data Visualization using Python	Matplotlib Library: Creating plots, charts, and graphs.	**Create** effective visual representations—such as plots, charts, and graphs—using MS Excel to **communicate** data-driven insights. **Utilize** Matplotlib to **generate and interpret** visualizations, enhancing understanding of data through various plot types.	4
4	Machine Learning	Introduction to Machine Learning Supervised Learning Unsupervised Learning	**Compare and evaluate** different types of plots and charts to determine the most effective method for specific datasets and goals. **Transform and preprocess** raw data to make it suitable for analysis and model development in machine learning workflows.	8

5	Deep Learning	Introduction to Deep Learning Deep Learning Frameworks and Libraries Core Deep Learning Techniques	**Analyze** the fundamentals of machine learning and **differentiate** between supervised and unsupervised learning approaches. **Build and assess** basic supervised and unsupervised ML models using Python to solve structured and unstructured problems.	6
6	Image Processing using Teachable Machines	Introduction to Computer Vision	**Define and examine** the concept of image processing and its role in AI-based systems. **Evaluate** how computer vision technologies are applied in the context of green technology and sustainability solutions.	2
7	Generative AI	Introduction to Generative AI Generative Models and Techniques	**Analyze and apply** the core principles of AI ethics to evaluate the impact of AI on sustainable development.	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	**Identify, assess, and address** issues of bias, fairness, and inequality in AI systems, ensuring responsible AI development. **Evaluate** existing regulatory and policy frameworks to ensure the ethical and equitable deployment of AI in sustainability-driven contexts.	4

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES			
LEARNING OUTCOME	**ASSESSMENT CRITERIA**	**PERFORMANCE CRITERIA**	**USECASES**
Analyze sustainability challenges	Analyze environmental challenges and identify sustainable solutions. Demonstrate knowledge of sustainable practices in energy efficiency, agriculture, and urban planning.	Evaluate the impact of sustainability practices using quantitative and qualitative measures. Propose innovative, AI-driven solutions for addressing sustainability challenges.	Use Case 1: Renewable Energy Optimization 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

		Showcase effective communication of sustainability concepts through presentations or reports.	recommend an efficient energy integration plan.
Evaluate AI-based solution / Apply foundational knowledge of Python and AI techniques	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.	Use Case 2: Analyzing Climate Change Data Scenario: Students are provided with global temperature and CO2 emission datasets to analyze climate trends over the past 50 years. Task: Use Excel to clean the data, calculate trends, and create visualizations that highlight the impact of CO2 emissions on global warming.
Design and develop innovative AI tools or models	Build basic supervised and unsupervised machine learning models. Implement deep learning models	Develop ML/DL models with high accuracy and efficiency. Demonstrate understanding of deep	Use Case 3: Predicting Solar Power Generation Scenario: An energy company needs a model to predict solar power output based on weather data.

	using frameworks like TensorFlow or PyTorch.	learning frameworks by building functional neural networks.	Task: Students must preprocess the data, build a machine learning model, and predict solar power output based on temperature, sunlight hours, and humidity.
Demonstrate problem-solving and Analytical Thinking	Identify ethical challenges in AI deployment. Evaluate regulatory frameworks and ensure compliance with AI ethics standards.	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.	Use Case 4: Ethical AI in Waste Management Scenario: A municipality uses AI to classify waste for recycling but faces challenges related to bias in AI decision-making. Task: Students must evaluate the AI system, identify biases, and propose solutions to improve fairness and efficiency while ensuring adherence to ethical standards.

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