Doctor of Philosophy (PhD) in Artificial Intelligence and Sustainability

🌎 Programme Overview

The **Doctor of Philosophy (PhD) in Artificial Intelligence and Sustainability** is an advanced, research-driven program designed to develop scholars and innovators who can harness the power of AI to address global sustainability challenges. The programme integrates **technological innovation, environmental science, and sustainable development principles** to create transformative solutions for industries, governments, and communities.

Students will explore how **AI, data analytics, and machine learning** can be applied to achieve **net-zero targets, resource efficiency, climate adaptation, and responsible production**. The programme encourages interdisciplinary collaboration, linking **engineering, social sciences, and environmental management** to produce impactful and ethical research outcomes.

🧠 Key Research Areas

- **AI for Climate Action and Energy Transition**
- **Sustainable Urban Systems and Smart Cities**
- **Circular Economy and Resource Optimization**
- **Green Supply Chain and Manufacturing Automation**
- **Predictive Analytics for Environmental Risk Management**
- **AI Ethics, Governance, and Sustainable Policy Design**
- **Carbon Accounting, ESG, and Sustainable Finance Modelling**

📚 Learning Outcomes

Graduates of the PhD in AI and Sustainability will be able to:

- Conduct **original research** that advances AI-driven sustainability solutions.
- Apply **systems thinking** and **data intelligence** to solve complex global challenges.
- Design **responsible AI systems** that support environmental, social, and economic sustainability.

- Influence **policy, strategy, and innovation** through evidence-based, ethical decision-making.
- Lead multidisciplinary teams and contribute to the **global sustainability agenda**.

🌱 Career Pathways

PhD graduates can pursue careers as:

- **AI Sustainability Researchers and Data Scientists**
- **Sustainability and ESG Strategists**
- **University Professors or Research Fellows**
- **AI Policy Advisors and Innovation Consultants**
- **Leaders in Green Technology, Energy, or Climate Solutions**

🧩 Programme Philosophy

This PhD programme is grounded in the belief that **technology and sustainability must evolve together**. By merging artificial intelligence with the principles of sustainable development, the programme aims to shape visionary leaders who drive **ethical innovation for a regenerative and equitable future**.

PhD in Artificial Intelligence and Sustainability – Curriculum Structure

1. Programme Duration

Full-Time/Part-Time: 1-2 years

Designed to accommodate advanced research, fieldwork, and industry collaboration

2. Core Modules (Year 1)

Foundational knowledge combining AI, sustainability, and systems thinking:

Module	Description
Advanced Artificial Intelligence	Deep learning, machine learning algorithms, neural networks, and AI system design.
Sustainable Development Principles	Global sustainability frameworks, SDGs, and environmental, social, and economic considerations.
Renewable Energy Systems and Smart Infrastructure	Application of AI in optimizing energy systems, grids, and urban sustainability projects.
Climate Modeling and Environmental Data Analytics	Using AI for climate prediction, impact assessment, and resource management.
Sustainable Operations and Circular Economy	Strategies for sustainable manufacturing, supply chains, and waste reduction.
Ethics, Governance, and Policy in AI	Responsible AI, ESG compliance, and regulatory frameworks in sustainability.

3. Research Methodology (Year 1)

Equipping students with advanced research skills for interdisciplinary studies:

Module	Description
Quantitative Methods and Machine Learning for Research	Statistical modeling, predictive analytics, and AI-driven data analysis.
Qualitative Research for Sustainability	Case studies, stakeholder analysis, and participatory research techniques.
Mixed Methods and Systems Thinking	Integrating qualitative and quantitative approaches for complex sustainability problems.

Big Data Analytics and IoT Applications	AI applications in real-time monitoring and data-driven environmental decision-making.
Academic Writing and Publication	Preparing peer-reviewed papers, grant proposals, and technical reports.

4. Elective Modules (Choose 2–4,Year 2)

Elective Description

Smart Cities and Urban Sustainability AI solutions for energy efficiency, water management, and transport systems.

Green Supply Chain Analytics Optimization of sustainable production and logistics using AI.

Climate Risk Management AI-based modeling for resilience, disaster prediction, and mitigation.

Carbon Accounting and ESG Reporting Using AI to track emissions, compliance, and sustainability performance.

AI for Circular Economy Applications of AI in recycling, waste reduction, and resource reuse.

Renewable Energy Forecasting Machine learning applications in solar, wind, and hybrid energy systems.

5. Dissertation/Thesis Focus (Year 2)

Key Components:

Proposal Development: Identify a research problem linking AI with sustainability challenges.

Literature Review: Comprehensive review of AI, environmental science, and sustainability research.

Empirical Research: Conduct field studies, simulations, or experiments using AI tools and sustainability frameworks.

Dissertation Writing: Document findings, AI models developed, and practical implications for sustainability.

Defense and Publication: Present research to faculty and publish in AI and sustainability journals.

Sample Dissertation Topics:

AI-Powered Smart Grid Optimization for Renewable Energy Integration

Predictive Modeling for Water Resource Management in Urban Areas

AI Applications in Circular Economy: Waste Reduction and Resource Efficiency

Climate Risk Forecasting Using Machine Learning

AI-Driven ESG Reporting and Corporate Sustainability Assessment

6. Additional Requirements

Industry Collaboration: Partner with sustainability-focused companies or government agencies for applied research.

Conferences and Seminars: Present research at AI, environmental, and sustainability conferences.

Professional Development: Training in AI ethics, data governance, and project management.

1st year USD3000

2nd year USD4500

2 years duration period

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