



# EG INTERNATIONAL ACADEMY

(by EMERALDGEARS INITIATIVE FOUNDATION GLOBAL under EGIF - capacity-strengthening initiatives)

## Certificate Course on Enacting a Circular Economy: AI-Powered Innovations for Sustainability

A 30-hour Certificate Course on " Enacting a Circular Economy: AI-Powered Innovations for Sustainability" can be structured into **five modules**, each covering key aspects of the circular economy and the role of **Artificial Intelligence (AI)** in advancing circular practices. Below is a **detailed breakdown** of the modules:

### Module 1: Foundations of the Circular Economy (6 hours)

📌 **Objective:** Understand the principles, policies, and need for a circular economy.

#### ◆ Topics Covered:

- Introduction to Circular Economy (CE) vs. Linear Economy
- Principles: **Reduce, Reuse, Recycle, Recover, and Regenerate**
- Policy and Regulatory Frameworks (EU Green Deal, India's CE Policy, UN SDGs)
- Business Case for CE: Benefits for Industries & Governments
- Real-World Case Studies: Successful Circular Models (e.g., IKEA, Patagonia)

#### ◆ AI in Circular Economy:

- AI for **Material Flow Analysis & Circular Supply Chains**
- Case Example: **Predictive analytics for waste reduction**

#### ◆ Hands-on Session:

- Circular Economy Mapping Tool using AI-based simulations

### Module 2: Circular Design and Sustainable Materials (6 hours)

📌 **Objective:** Explore sustainable materials and AI-driven eco-design.

#### ◆ Topics Covered:

- **Eco-Design & Life Cycle Thinking**
  - AI-powered design for **product longevity**
  - Digital Twin Technology in product development

## EG International Academy

O-464, Gaur City Center, Gaur Chowk, West, Sector 4, Greater Noida, Uttar Pradesh-201318, INDIA

Ph: 0120-5106662

Website: [www.egacademy.org.in](http://www.egacademy.org.in)

Email: [support@egacademy.org.in](mailto:support@egacademy.org.in)



# EG INTERNATIONAL ACADEMY

(by EMERALDGEARS INITIATIVE FOUNDATION GLOBAL under EGIF - capacity-strengthening initiatives)

- **Sustainable Material Innovations**
  - Biodegradable & Recyclable materials
  - AI-driven **material optimization & selection**
- **Smart Manufacturing & AI Integration**
  - 3D Printing & AI for material efficiency
  - Role of **Generative AI** in eco-design

#### ◆ Hands-on Session:

- AI-driven **Life Cycle Assessment (LCA)** for product sustainability

## Module 3: AI-Driven Waste Management and Reverse Logistics (6 hours)

📌 **Objective:** Learn AI applications in waste management & circular supply chains.

#### ◆ Topics Covered:

- **Smart Waste Management**
  - AI-based **sorting & waste classification systems**
  - Blockchain for **waste tracking & transparency**
- **Reverse Logistics & Product Recovery**
  - AI-powered demand forecasting for remanufacturing
  - Automated **waste collection & sorting**
- **Waste-to-Energy Innovations**
  - AI models for **efficient energy recovery from waste**

#### ◆ Hands-on Session:

- AI-powered **waste stream analytics using Python**

## EG International Academy

O-464, Gaur City Center, Gaur Chowk, West, Sector 4, Greater Noida, Uttar Pradesh-201318, INDIA


Ph: 0120-5106662 Website: [www.egacademy.org.in](http://www.egacademy.org.in) Email: [support@egacademy.org.in](mailto:support@egacademy.org.in)



# EG INTERNATIONAL ACADEMY

(by EMERALDGEARS INITIATIVE FOUNDATION GLOBAL under EGIF - capacity-strengthening initiatives)

## Module 4: Business Models & AI-Powered Circular Economy (6 hours)

 **Objective:** Understand sustainable business models & AI-driven innovations.


### ◆ Topics Covered:

- **Circular Business Models**
  - Product-as-a-Service (PaaS)
  - Sharing Economy & AI-powered Platforms (e.g., Uber, Airbnb)
- **AI for Sustainable Finance & Carbon Tracking**
  - AI-based **ESG reporting tools**
  - Climate risk assessments using AI
- **Digital Marketplaces & AI**
  - AI-powered **material exchange platforms**
  - B2B platforms for **recycled materials**

### ◆ Hands-on Session:

- Build an AI-powered **circular business model canvas**

## Module 5: Circular Cities and Policy Implementation (6 hours)

 **Objective:** Explore AI-driven urban sustainability & policy strategies.

### ◆ Topics Covered:

- **Circular Cities: AI for Urban Sustainability**
  - Smart Grids & AI-based energy efficiency solutions
  - AI-driven water management systems
- **Policy & Governance for CE**
  - AI-driven policy simulations for circular economy
  - Public-private partnerships in CE transition

## EG International Academy

O-464, Gaur City Center, Gaur Chowk, West, Sector 4, Greater Noida, Uttar Pradesh-201318, INDIA

Ph: 0120-5106662 Website: [www.egacademy.org.in](http://www.egacademy.org.in) Email: [support@egacademy.org.in](mailto:support@egacademy.org.in)



# EG INTERNATIONAL ACADEMY

(by EMERALDGEARS INITIATIVE FOUNDATION GLOBAL under EGIF - capacity-strengthening initiatives)

- **Ethical AI & Circular Economy Risks**
  - AI ethics in sustainable development
  - Bias in AI-driven waste management models

## ◆ Hands-on Session:

- AI-based **Circular City Simulation Model**

## Final Assessment & Certification (Optional)

📌 **Objective:** Evaluate understanding & application of AI in Circular Economy.

- Case Study Presentation
- AI-driven Circular Economy Project
- Certification upon successful completion

## Course Delivery & Target Audience

- **Mode:** Online (Live Sessions + Self-Paced Assignments)
- **Tools Used:** Python, AI Simulation Tools, LCA Software, IoT Sensors
- **Target Audience:** Professionals, Entrepreneurs, Policy Makers, Researchers

## Outcome & Key Takeaways

- ✓ Master AI applications in Circular Economy
- ✓ Develop AI-based business models for sustainability
- ✓ Learn predictive analytics for waste & material flow
- ✓ Earn a **30-hour Certificate in AI & Circular Economy**

## EG International Academy

O-464, Gaur City Center, Gaur Chowk, West, Sector 4, Greater Noida, Uttar Pradesh-201318, INDIA

Ph: 0120-5106662 Website: [www.egacademy.org.in](http://www.egacademy.org.in) Email: [support@egacademy.org.in](mailto:support@egacademy.org.in)