Sustainable Chemical Manufacturing Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Sustainable Chemical Manufacturing Training Course is designed to equip learners with advanced knowledge in green chemistry, industrial sustainability, cleaner production technologies, and ESG-compliant chemical engineering practices. As global industries transition toward carbon-neutral manufacturing, circular economy models, and zero-waste production systems, this course provides a comprehensive foundation in optimizing chemical processes while minimizing environmental impact. Participants gain deep insights into eco-efficient process design, renewable feedstocks, life-cycle assessment (LCA), and sustainable supply chain integration.

This training program bridges the gap between traditional chemical engineering and modern sustainability standards driven by UN SDGs, ESG frameworks, and global climate regulations. It empowers professionals to implement energy-efficient reactors, green solvents, waste valorization, and pollution prevention strategies in real industrial environments. With a strong focus on digital transformation, process intensification, and decarbonization technologies, learners are prepared to lead innovation in next-generation sustainable chemical industries.

Programme Curriculum

Sustainable Chemical Manufacturing Training Course

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Course Objectives

1. Master principles of Green Chemistry & Sustainable Engineering
2. Understand carbon footprint reduction in chemical manufacturing
3. Apply Life Cycle Assessment (LCA) tools for process optimization
4. Design energy-efficient and low-emission chemical processes
5. Implement circular economy strategies in industrial systems
6. Evaluate and select eco-friendly raw materials and bio-based feedstocks
7. Develop skills in waste minimization and industrial symbiosis
8. Integrate ESG compliance and sustainability reporting frameworks
9. Apply process intensification and smart manufacturing techniques
10. Analyze renewable energy integration in chemical plants
11. Optimize water and resource management systems
12. Adopt digital twin and AI-driven process optimization tools
13. Lead decarbonization and net-zero transition strategies

Target Audience

1. Chemical Engineers and Process Engineers
2. Environmental and Sustainability Engineers
3. Industrial Chemists and Research Scientists
4. Manufacturing Plant Managers and Operations Heads
5. ESG and Corporate Sustainability Officers
6. Energy and Resource Efficiency Consultants
7. Graduate Students in Chemical/Environmental Engineering
8. Government Regulators and Policy Makers in Industrial Compliance

Course Modules

Module 1: Foundations of Sustainable Chemical Manufacturing

- Principles of green chemistry and sustainability frameworks
- Environmental impact of traditional chemical processes
- Introduction to ESG and global sustainability standards
- Industrial pollution prevention strategies
- Resource efficiency and cleaner production concepts
- **Case Study:** Transition of a petrochemical plant into a low-emission manufacturing facility

Module 2: Green Chemistry & Eco-Friendly Materials

- Bio-based raw materials and renewable feedstocks
- Safer chemical synthesis routes
- Solvent replacement and green alternatives
- Catalysis for sustainable reactions
- Toxicity reduction in chemical design
- **Case Study:** Replacement of toxic solvents in pharmaceutical manufacturing

Module 3: Energy Efficiency & Decarbonization

- Energy optimization in chemical plants
- Carbon capture and utilization (CCU) technologies
- Heat integration and process intensification
- Renewable energy integration
- Net-zero industrial roadmap development
- **Case Study:** Decarbonization strategy in an ammonia production facility

Module 4: Life Cycle Assessment (LCA) & Carbon Accounting

- LCA methodology and frameworks
- Carbon footprint measurement techniques
- Environmental impact indicators
- Sustainability reporting tools
- ISO 14040/14044 standards application
- **Case Study:** LCA of biodegradable plastics vs conventional plastics

Module 5: Waste Minimization & Circular Economy

- Industrial waste stream analysis
- Waste-to-value and by-product recovery
- Zero-liquid discharge (ZLD) systems
- Circular economy integration models
- Industrial symbiosis networks
- **Case Study:** Waste heat recovery in a fertilizer manufacturing plant

Module 6: Process Intensification & Smart Manufacturing

- Advanced reactor design concepts
- Microreactors and continuous flow systems
- AI and machine learning in process control
- Digital twins for chemical plants
- Automation and smart sensors
- **Case Study:** AI-optimized continuous polymer production line

Module 7: Water & Resource Sustainability

- Water footprint reduction strategies
- Industrial wastewater treatment technologies
- Resource recycling and reuse systems
- Membrane filtration and advanced oxidation
- Sustainable utility management
- **Case Study:** Water recycling system in a textile chemical plant

Module 8: ESG Integration & Sustainable Industrial Strategy

- ESG frameworks and compliance requirements
- Sustainability KPIs and reporting systems
- Corporate sustainability strategy development
- Regulatory policies and environmental governance
- Net-zero transition planning
- **Case Study:** ESG transformation in a global specialty chemicals company

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com