Nanotechnology in Chemical Engineering 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

Nanotechnology in Chemical Engineering is revolutionizing the global process industries by enabling molecular-level manipulation of matter, leading to breakthroughs in advanced materials, process intensification, catalysis, separation technology, and sustainable manufacturing. Nanotechnology in Chemical Engineering Training Course is designed to equip learners with cutting-edge knowledge of nanomaterials, nanoscale phenomena, and industrial nanoprocesses that are reshaping sectors such as petrochemicals, pharmaceuticals, energy, water treatment, and food processing. Participants will explore how nano-enabled engineering solutions improve efficiency, reduce environmental impact, and enhance product performance.

With the rapid rise of Industry 4.0, smart manufacturing, green chemistry, and AI-integrated process design, nanotechnology has become a core pillar of next-generation chemical engineering. This course bridges the gap between theoretical nanoscience and real-world industrial applications, focusing on nanocatalysts, nanofluids, membrane nanotechnology, nanocomposites, and surface engineering. Learners will gain hands-on understanding of how nanotechnology drives sustainable innovation, carbon neutrality, and high-performance chemical processes.

Programme Curriculum

Nanotechnology in Chemical Engineering Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamentals of nanotechnology in chemical engineering
2. Analyze nanoscale phenomena and quantum effects in materials
3. Apply nanomaterials in industrial process design
4. Evaluate nanocatalysts for reaction enhancement
5. Design nano-enabled separation and membrane systems
6. Explore nanofluids for heat transfer optimization
7. Develop knowledge of nanocomposites in material engineering
8. Integrate green nanotechnology for sustainable processes
9. Assess safety and toxicity in nano-process engineering
10. Apply process intensification using nanotechnology
11. Study industrial applications in pharma, energy, and petrochemicals
12. Utilize computational tools for nanoscale modeling and simulation
13. Implement real-world case studies in industrial nanotechnology deployment

Target Audience

1. Chemical Engineers
2. Process Engineers
3. Materials Scientists
4. R&D Scientists in Nanotech
5. Industrial Chemists
6. Mechanical Engineers in Energy Sector
7. Biotechnology Engineers
8. Graduate & Postgraduate Engineering Students

Course Modules

Module 1: Fundamentals of Nanotechnology in Chemical Engineering

- Introduction to nanoscale science and engineering
- Quantum effects and surface-to-volume ratio
- Types of nanomaterials
- Synthesis techniques
- Case Study: Nano-TiO? in industrial coatings for self-cleaning surfaces

Module 2: Nanomaterials and Advanced Material Science

- Carbon nanotubes, graphene, fullerenes
- Mechanical and thermal properties at nanoscale
- Functionalization of nanomaterials
- Industrial-grade nanocomposites
- Case Study: Graphene-based aerospace material enhancement

Module 3: Nanocatalysis in Chemical Reactions

- Principles of nanocatalysts
- Surface activity and reaction kinetics
- Heterogeneous vs homogeneous nanocatalysis
- Catalyst regeneration and efficiency improvement
- Case Study: Platinum nanoparticles in fuel cell technology

Module 4: Nanofluids in Heat Transfer Systems

- Definition and thermophysical properties
- Enhancement of thermal conductivity
- Applications in heat exchangers
- Stability and dispersion techniques
- Case Study: Nanofluids in nuclear reactor cooling systems

Module 5: Nanotechnology in Separation Processes

- Nano-membranes and filtration mechanisms
- Water purification using nanotechnology
- Gas separation techniques
- Desalination technologies
- Case Study: Carbon nanotube membranes in seawater desalination

Module 6: Nanotechnology in Energy Systems

- Solar cells and nano-enhanced photovoltaics
- Energy storage systems
- Hydrogen production and storage
- Fuel efficiency improvements
- Case Study: Nano-silicon batteries in electric vehicles

Module 7: Environmental & Green Nanotechnology

- Pollution control using nanotech
- Wastewater treatment applications
- Air purification systems
- Eco-friendly nano-materials
- Case Study: Nano-iron particles for groundwater remediation

Module 8: Industrial Applications & Process Intensification

- Nano-enabled process optimization
- Scale-up challenges in industry

- AI + nanotechnology integration
- Smart manufacturing systems
- Case Study: Petrochemical plant efficiency improvement using nanocatalysts

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

Start Date	End Date	Location	Price
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:

Register Online Now

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