Petrogenium. Academy

Process Technology

Using Generative AI in Process Design, Chemical Engineering & Process Safety

Consultant / Trainer
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This **Petrogenium.** 2-day course introduces engineers to the practical use of Generative AI in process design, chemical engineering, and process safety. Participants will learn how to apply Generative AI for calculations, simulations, and documentation in real engineering workflows. The training covers process design fundamentals, control strategies, HAZOP/LOPA facilitation, and safety studies. Hands-on workshops with case studies in hydrogen, ammonia, methanol, and SAF ensure direct industry relevance. By the end, participants will be equipped to integrate Generative AI effectively while validating results against engineering standards.

Participants

1. Process Engineers involved in process design, simulation, and optimization.
2. Chemical Engineers working on equipment sizing, thermodynamics, and reaction engineering.
3. Process Safety Engineers responsible for HAZOP, LOPA, C&E diagrams, and SIS/SRS development.
4. Control & Automation Engineers working on P&IDs, control narratives, and process automation strategies.
5. Project & Design Engineers in oil & gas, hydrogen, ammonia, methanol, and sustainable fuels projects.
6. Engineering Managers & Consultants seeking productivity gains and standardization with Generative AI.

Learning Objectives

Participants will learn how to apply **Generative AI** in process design, chemical engineering, and process safety studies.

They will develop skills **in calculations, equipment sizing, control schemes, and documentation** support.

The course builds competence in **HAZOP, LOPA**, and safety instrumented system development with ChatGPT assistance.

By the end, participants can **integrate Generative AI** into engineering workflows while ensuring validation against standards.

Programme

DAY 1

Module 1: Introduction to Generative AI in Process Engineering

1. Role of **Generative AI** -powered tools in Chemical Engineering & Process Safety
2. Overview of **Generative AI** capabilities, limitations, and reliability checks
3. Integrating **Generative AI** with engineering workflows (simulation tools; HYSYS, UNISIM)
4. Importing Process Flow Scheme and P&ID in ChatGPT

Module 2: Process Design Fundamentals with ChatGPT

1. Material & Energy Balances (H&MB generation support)
2. Stream property predictions (enthalpy, phase, compositions)
3. Equipment design calculations:
    - Heat exchangers (UA, LMTD, approach temperatures)
    - Pumps & compressors (pump curves, surge line, NPSH)
    - Distillation columns (McCabe-Thiele, shortcut distillation, tray efficiency)

Workshop: Using Generative AI to draft a Heat & Material Balance for a Distillation column case study

Programme

DAY 2

Module 3: Process Control & Automation

1. Control loop narratives (flow, pressure, temperature, level control)
2. P&ID development support and tag generation
3. Control valve sizing and pump minimum flow protection
4. **Generative AI** as Copilot for Dynamic Simulations in UNISIM/HYSYS

Module 4: Specialised Chemical Engineering Applications

1. Reactor kinetics support (CSTR, PFR, catalytic reactors)
2. Thermodynamics (VLE, EOS, property methods)
3. Separation technologies: distillation, membrane, adsorption, and extraction
4. Process intensification concepts

Workshop: Drafting a process control scheme for a Distillation column case study

Why select Petrogenium.?

The above support will be provided by principal consultants with 30+ years world-class experience in the technology and hands-on know-how from operation of refinery units.

Contact Petrogenium.:

Email: training@petrogenium.com
Website:https://www.petrogenium.com/training/

Because Experience Matters