

Pipeline Engineering Programme

Module MC03: Pipeline System Design



Key Facts

- ✓ **Duration:** 2 weeks
- ✓ **Format:** In-person & online (Leoben, Austria)
- ✓ **Language:** English
- ✓ **Certificate:** Micro-Credential (ECTS transferable)
- ✓ **Prerequisites:** Technical background in fluid mechanics or engineering recommended; none required

Key Learning Outcomes

1. Describe key fluid mechanics and thermodynamics principles relevant to pipeline systems.
2. Perform steady-state hydraulic calculations for liquid and gas pipelines.
3. Analyse pressure profiles and flow distributions in pipeline networks.
4. Apply basic methods for pipeline system optimisation.
5. Evaluate pipeline designs considering technical, economic, safety, and environmental factors.
6. Integrate engineering and stakeholder considerations into pipeline design decisions.

Module Overview

This module provides a solid foundation in pipeline system design by integrating hydraulic principles with optimization strategies. It covers fluid mechanics fundamentals, including fluid properties, pressure loss calculations, and key thermodynamic aspects. Steady-state hydraulic analysis for liquid and gas systems is introduced with focus on flow behavior and pressure profiles. The module also outlines methods for optimizing pipeline systems by considering CAPEX, OPEX, dynamic flow behavior, safety, sustainability, and public acceptance. Combined, these topics ensure a clear understanding of the key parameters that shape efficient and reliable pipeline system design.

Course Outline

1. **Fundamentals:** Introduction & overview, fluid properties, pipeline fluid mechanics, pipeline thermodynamics.
2. **Conceptual System Design:** Basis of system design, pressure profile development, pump/compressor station evaluation.
3. **System Optimization:** Introduction to system design optimization, cost element estimating, optimization approaches, and dynamic simulation studies.
4. **Complementary Requirements:** Operational safety and risk assessment, environmental sustainability, and emissions impact, as well as stakeholder acceptance.

Instructors



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