



Technical University
of Leoben

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DEPARTMENT
GEO ENERGY

Pipeline Engineering Programme

Module MC09: Special Pipeline Systems



Key Facts

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

Key Learning Outcomes

1. Analyse and design upstream gathering systems for multiphase flow and terrain-related challenges.
2. Evaluate CO₂ pipeline design practices for corrosion control, containment, and compliance with CCS-related transport and storage requirements.
3. Apply safety and design standards for ammonia pipelines, including leak and pressure control.
4. Design hot-fluid transport systems with appropriate insulation and high-temperature materials.
5. Address technical and safety challenges to ensure reliable operation of specialized pipelines.

Module Overview

This module offers an overview of specialized pipeline systems for challenging or high-risk fluids. It covers upstream flow lines and gathering systems with a focus on multiphase flow, terrain effects and flow assurance. CO₂ pipelines are examined in terms of safety, material compatibility and CCS regulatory requirements. Ammonia pipelines are addressed with emphasis on toxicity, pressure containment and leak prevention. The module also reviews hot-fluid transport, including thermal management, insulation and material selection. Together, these topics provide a solid understanding of the engineering challenges and design solutions for complex pipeline environments.

Course Outline

1. **Upstream Flow Lines and Gathering Systems:** Multiphase flow behaviour, terrain effects, flow assurance, layout in complex topography and key operational practices.
2. **CO₂ Pipeline Systems (CCS):** Evaluate CO₂ pipeline design practices for corrosion control, containment, and compliance with CCS-related transport and storage requirements.
3. **Ammonia Transport Pipelines:** Ammonia properties, pressure containment, leak prevention, material selection and relevant regulatory requirements.
4. **Hot Fluid Transport Pipelines:** High-temperature applications, thermal expansion, insulation, material selection, flexibility and system monitoring.

Instructors

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