



Technical University
of Leoben

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DEPARTMENT
GEO ENERGY

Pipeline Engineering Programme

Module MC06: Pipeline Instrumentation and Automation



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. Understand the fundamentals of automation, control, and measurement technology.
2. Gain an overview of key equipment, including PLCs, sensors, and actuators.
3. Be able to specify SCADA and telecommunications architectures for pipeline operations.
4. Gain insight into key SCADA applications for pipelines and their interfaces.
5. Develop SCADA configurations, including associated system configurations for pipeline operations.
6. Understand lifecycle management for the maintenance and upgrading of SCADA and automation systems.
7. Ensure safety integrity and cybersecurity in control systems.

Instructors

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Module Overview

The first part of the module introduces the fundamentals of instrumentation, automation, and control systems in pipeline engineering. It covers measurement principles, data acquisition, control logic, and automation architectures, including PLCs, DCS, and SCADA systems.

The second part provides insights into the design of SCADA, automation, and control systems for pipelines. In addition, practice-oriented information will be provided on the implementation, operation, and upgrading of SCADA and automation systems and instrumentation.

Upon completion, participants will be able to plan and operate reliable, efficient, and secure instrumentation, automation, and SCADA systems for pipeline operations.

Course Outline

1. **Instrumentation, Data Acquisition, and Monitoring:** System architecture, data acquisition, signal analysis, monitoring concepts, safety instrumentation, and real-time monitoring.
2. **Automation and Control Systems:** Automation components, PLCs, DCS, data management, and visualization.
3. **System Design, Integration, Communication, and Cybersecurity:** SCADA design and system integration, communication protocols, HMI systems, and data handling.
4. **SCADA Applications in Pipeline Operations:** Applications such as leak detection systems and interfaces to ERP and other enterprise systems.
5. **System Implementation:** Project execution aspects including tendering, factory acceptance testing (FAT), commissioning, and start-up.
6. **Lifecycle Management and Future Development:** System maintenance, upgrades, modernization strategies, and future trends.