Piping Systems: Design and Analysis for Single and Multiphase Flows

Focus on: The Manager ☐ The Specialist ☑ Spotlight Programme ☐ Hands-on Skills ☑

Course Overview

This course provides comprehensive training on all aspects of the flow processes in piping systems used in Chemical, Petroleum, Mechanical and Civil Engineering Industries. It begins with an in-depth exploration of different types of flows that take place in the above-mentioned industries, examining the complex nature of the flows and the flow parameters. Participants will then gain a detailed understanding of the piping system design including associated fixtures such as valves, elbows and junctions.

The course focuses on current state of the art technologies, software tools, and industry best practices. It includes real-world examples and case studies, ensuring participants develop a practical and theoretical understanding of piping systems' design.

Designed as an introductory course, this program is ideal for industry professionals seeking to familiarize themselves with the key design processes and gain insights into the issues associated with piping systems transporting single and multiphase mixtures. It equips attendees with essential knowledge and skills to navigate the fluid transport sector effectively.

Course Objectives		This Course is Ideal For:	
1	**Comprehensive Understanding of various types of flow** – Learn about the different types of flow encountered in a pipeline for single and multiphase mixtures.	✓	Pipeline Engineers, Managers, Designers
2	**Detailed Fluid Mechanics of single and multiphase flows** – Explore the essential differences between the single and multiphase flow characteristics and their impact on systems' performance.	✓	Pipeline Engineers, Managers, Designers, Executives
3	**Design of Single-phase Piping Systems** – Gain knowledge of current industry technologies and operational best practices.	✓	Pipeline Engineers, Managers, Designers, Executives.
4	**Design of Multiphase Piping Systems** – Gain knowledge of current industry technologies and operational best practices.	✓	Pipeline Engineers, Managers, Designers, Executives.
5	**Pipeline Optimisation Economics** – Understand the economic factors influencing pipeline systems.	✓	Corporate Planners, Oil and Gas Directors who would appreciate a better understanding of the Piping system Economics

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Course Content		
Day	**Theme**	**Coverage**
1	Comprehensive Understanding of various types of flow	• Introduction • Regimes of flows in single phase flow • Flow characterization for single phase flow • Flow classification for single phase flow • Flow/fluid/geometric variables for single phase flow • Regimes of flow in multiphase flow • Flow characterization for multiphase flow • Flow classification for multiphase flow • Flow/fluid/geometric variables for multiphase flow
2	Detailed Fluid Mechanics of single and multiphase flows	• Single Phase Pipe flow • Flow behavior and essential parameters for single phase flow • Flow analysis through piping system for single phase flow • Flow behavior and essential parameters for pipe fittings for Single phase flow • Multiphase Pipe flow • Flow behavior and essential parameters for multiphase flow • Flow analysis through piping system for multiphase flow • Flow behavior and essential parameters for pipe fittings for multiphase flow
3	Design of Single-phase Piping Systems	• Design Specification for piping system design • Pressure drop analysis • Pipeline sizing • Pumping requirement estimation • Power requirement calculation • Operational and capital cost calculations • Optimization • Case study – example
4	Design of Multi-phase Piping Systems	• Design Specification for piping system design • Pressure drop analysis • Pipeline sizing • Pumping requirement estimation • Power requirement calculation • Operational and capital cost calculations • Optimization • Case study – example

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5	Pipeline Economics	• Pipeline Economics • Cost Estimation • Economic Evaluation • Case Studies • Group Discussions • Course Evaluation & Course Summary

Course Assessment	Certification
Participants will be assessed on: Participation in sessions Completion of exercises & case studies Performance in assessments	Upon successful completion of the course, participants will receive a **Certificate of Successful Completion**, along with a **Transcript of Marks** showing the performance by grade in each element of assessment and overall.

Course Instructor

The speaker for this programme is Professor of Thermofluid Engineering at a leading UK university. He is an expert in fluid systems, renewable energy, asset management, and digital twins.
He has published more than 200 papers in world leading journals and international conference proceedings, and has been invited to give key note lectures all around the world.