MERCURY

# Multiphase Flowmetering Course

12 – 23 September 2027
Cairo (Egypt)



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Istanbul - Türkiye: +90 539 599 1206
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**Ref:** 16233_1011665 **Date:** 12 – 23 September 2027 **Location:** Cairo (Egypt) **Fees:** 6500 Euro

## Introduction:

Multiphase flowmetering is a critical technology in the oil and gas, petrochemical, and process industries. This Multiphase Flowmetering training course aims to provide an in-depth understanding of the principles, design, and operation of multiphase flowmeters used to measure complex mixtures of oil, gas, and water. Participants will explore various types of multiphase flowmeters, their applications, and best practices for selecting and maintaining them.

The Multiphase Flowmetering course covers the challenges associated with measuring multiphase flows and how modern metering technologies address these issues. Learners will gain practical skills in interpreting data, troubleshooting, and optimizing flow measurement systems to enhance production efficiency and safety. It bridges theoretical knowledge with real-world applications in multiphase flow measurement. Participants will confidently lead and manage multiphase flow metering projects.

## Targeted Groups:

This Multiphase Flowmetering training targets professionals seeking specialized knowledge and skills:

- Engineers are involved in oil and gas production and processing.
- Flow measurement specialists and instrumentation engineers.
- Operations and maintenance personnel in oilfields and refineries.
- Technical sales and service engineers for flowmeter equipment.
- Project managers oversee flow measurement system installations.
- Researchers and academics interested in multiphase flow technologies.
- Quality assurance and control staff in the petroleum industry.
- Professionals preparing for certification in flow measurement.

## Course Objectives:

Participants will achieve the following objectives by completing the Multiphase Flowmetering course:

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- Understand fundamental concepts of multiphase flow and its challenges.
- Identify different types of multiphase flowmeters and their operating principles.
- Analyze flowmeter data to optimize oil, gas, and water production rates.
- Apply troubleshooting techniques for common flowmeter issues.
- Evaluate factors affecting measurement accuracy and reliability.
- Design and implement flow measurement systems for various industrial settings.
- Integrate multiphase flowmeters with process control and monitoring systems.
- Develop skills to manage installation, calibration, and maintenance procedures.
- Interpret regulatory and safety standards relevant to multiphase metering.
- Enhance decision-making capabilities in selecting suitable flow measurement technologies.

## Targeted Competencies:

Participants will gain the following competencies during the Multiphase Flowmetering program:

- Mastery of multiphase flow principles and measurement challenges.
- Proficiency in operating and interpreting multiphase flowmeter data.
- Capability to diagnose and resolve metering performance issues.
- Ability to select appropriate flowmeter technologies for specific applications.
- Skills to implement and maintain reliable flow measurement systems.
- Understanding of integration techniques with industrial control systems.
- Knowledge of safety and regulatory compliance in metering operations.
- Competence in project planning and execution related to flowmeter deployment.

## Course Content:

### Unit 1: Introduction to Multiphase Flow:

- Define multiphase flow and its significance in industry.
- Understand the phases involved: oil, gas, water, and solids.
- Discuss flow regimes and patterns in pipelines.
- Explain the challenges of measuring multiphase flow.
- Overview of multiphase flow applications.

### Unit 2: Fundamentals of Flow Measurement:

- Principles of flow measurement for single and multiphase flows.
- Measurement units and standards.
- Review fluid dynamics concepts related to flow measurement.
- Impact of flow regime on measurement accuracy.
- Overview of measurement errors and uncertainties.

### Unit 3: Types of Multiphase Flowmeters:

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- Description of common multiphase flowmeters:
  - Electrical Submersible Pumps ESP meters.
  - Gamma Ray and Nuclear meters.
  - Venturi and Orifice meters.
  - Coriolis flowmeters.
  - Ultrasonic and differential pressure meters.
- Advantages and limitations of each type.
- Selection criteria based on application needs.

## Unit 4: Installation and Calibration of Flowmeters:

- Proper installation guidelines and best practices.
- Calibration procedures for multiphase flowmeters.
- Tools and techniques for calibration accuracy.
- Common installation errors and how to avoid them.
- Periodic maintenance schedules.

## Unit 5: Data Acquisition and Interpretation:

- Data types generated by multiphase flowmeters.
- Signal processing and noise reduction techniques.
- Techniques for data validation and correction.
- Use of software for data analysis.
- Case studies on interpreting flow data.

## Unit 6: Troubleshooting Multiphase Flowmeters:

- Common operational issues in multiphase flow measurement.
- Diagnostic tools and methods.
- Root cause analysis for measurement deviations.
- Corrective actions and preventive maintenance.
- Handling extreme operating conditions.

## Unit 7: Advanced Measurement Technologies:

- Introduction to emerging multiphase flowmeter technologies.
- Use of AI and machine learning in flow measurement.
- Real-time monitoring and remote diagnostics.
- Integration with SCADA and control systems.
- Future trends and innovations.

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## Unit 8: Safety and Regulatory Compliance:

- Industry standards relevant to multiphase flowmeters.
- Health, safety, and environmental considerations.
- Risk assessment in metering operations.
- Compliance with local and international regulations.
- Documentation and reporting requirements.

## Unit 9: Case Studies and Applications:

- Real-world examples from oilfields and refineries.
- Problem-solving exercises based on actual scenarios.
- Best practices for optimizing multiphase metering systems.
- Lessons learned from field deployments.
- Cost-benefit analysis of metering technologies.

## Unit 10: Project Management and Implementation:

- Planning and managing multiphase flowmeter projects.
- Budgeting and resource allocation.
- Stakeholder communication and coordination.
- Quality control and performance monitoring.
- Post-installation evaluation and continuous improvement.

# Final Insights & Key Takeaways:

Multiphase flowmetering is crucial for optimizing hydrocarbon production and ensuring operational efficiency. Mastery of flowmeter technologies and data interpretation enables informed decision-making and effective risk management. This course equips professionals with the knowledge to confidently handle complex flow scenarios. Continuous innovation in multiphase flow measurement promises improved accuracy and integration in the future.