

Course Description Sheet

COURSE TITLE

Hydraulic Principles for Municipal Systems Understanding Flow, Pressure, and Design

COURSE DURATION

1 Hour

OVERVIEW

Municipal operations staff are subject to service disruptions, equipment failures, and costly emergency repairs due to inadequate understanding of hydraulic principles that govern water and wastewater systems. The majority of pumping system problems and pressure-related issues can be prevented by applying proper hydraulic fundamentals and maintenance protocols. This interactive online course will teach you how to analyze fundamental hydraulic principles including pressure, flow, and head relationships to optimize municipal water and wastewater system performance. Additionally, you will learn flow measurement techniques using the Continuity Equation and Bernoulli's principle, pipe network design considering friction losses and pump characteristics, and comprehensive troubleshooting strategies to prevent hydraulic system failures and extend equipment lifespan.

PREREQUISITES

No prior knowledge is required.

BEHAVIORAL OBJECTIVES

By the end of this course, you will be able to:

- Analyze fundamental hydraulic principles including pressure, flow, and head relationships to optimize municipal water and wastewater system performance
- Explain flow measurement techniques and calculations using the Continuity Equation and Bernoulli's principle to troubleshoot system inefficiencies and maintain regulatory compliance
- Evaluate pipe networks considering friction losses, valve operations, and pump characteristics to ensure adequate service delivery throughout distribution zones
- Implement comprehensive troubleshooting strategies using diagnostic tools and maintenance protocols to prevent hydraulic system failures and extend equipment lifespan

COURSE OUTLINE

Chapter	Minutes
Introduction	5
Essential Pumping System Components	8
Master Fluid Flow Fundamentals	10
Pressure and Head Calculations	8
Smart Hydraulic Design Strategies	10
Proven Troubleshooting Techniques	10
Critical Safety and Compliance	2
Expert Resources and Applications	5

Conclusion	2
Course Total	60

AVAILABILITY

This course is offered online and is available 24 hours a day, 7 days a week, 365 days a year.

TRAINING METHODOLOGY & EVALUATION

This course is self-paced online training. Review exercises reinforce the content, and students are evaluated with a multiple-choice exam. Upon completion, students are prompted to submit a course evaluation.

REFERENCES

- American Water Works Association. (2019). Pumping station design (4th ed.). American Water Works Association.
- Haested Methods, Inc. (2021). Water distribution modeling and management. Bentley Systems.
- Mays, L. W. (2020). Water distribution systems handbook (2nd ed.). McGraw-Hill Education.
- Walski, T. M., Chase, D. V., Savic, D. A., Grayman, W., Beckwith, S., & Koelle, E. (2018). Advanced water distribution modeling and management. Bentley Institute Press.
- Water Environment Federation. (2017). Design of municipal wastewater treatment plants: Manual of practice No. 8 (5th ed.). McGraw-Hill Education.