Water Transmission and Distribution II

Course Overview

This course is designed to provide an advanced understanding of Water Transmission and Distribution, system maintenance and inspection, and the safety of the public water supply. Course material consists of reading assignments, video lectures, review questions, study problems and lesson quizzes.

Course completion requires that the student successfully complete each component of each individual lesson. Review questions and written assignments must be submitted either online or uploaded in a Word document for the professor's review. Lesson quizzes have a minimum passing score of 70%.

Upon successful completion of the course requirements, students will receive a certificate of completion for 4.9 CEUs (49 contact hours) for the *Water Transmission and Distribution II* course, which is applicable toward a Certificate in Water Treatment Technology from American Water College.

Water Transmission and Distribution II (4.9 CEUs)

- Water Meters
- Backflow Prevention and Cross- Connections Control
- Water Main Installation
- Backfilling, Main Testing, and Installation Safety
- System Operations
- Water Services
- Information Management
- System Security and Emergency Response
- Public Relations

Required Texts

Textbook: Water Distribution Operator Training
Handbook Edition: Fourth Edition
Authors: William C.
Lauer ISBN: 978-1-
58321-954-6

Textbook: Water Treatment Operator Training Handbook
Edition: Third Edition
Authors: Nicholas Pizzi and William C.
Lauer ISBN: 978-1-58321-861-7

Water Transmission and Distribution II

Educational Objectives

- To acquaint students with water metering, meter testing, maintenance and repair, and meter reading
- To provide students with a foundational knowledge of backflow prevention and the reasons for cross-connection control
- To acquaint students with water mains, installation and safety
- To provide students with a foundational knowledge information management and record-keeping responsibilities
- To acquaint students with threats to the public water supply, vulnerabilities in the public water supply, and emergency response plans
- To provide a foundational understanding of public relations and the importance of an informed public

Evaluation

Students will be graded on their performance on each lesson quiz, and their course participation. Unless each unit is completed, the student will not be permitted to advance to the next lesson, and the student will not be awarded credit for completion until all assignments, quizzes and lectures are completed. Please contact our office with any questions.

Support

Students can contact our student support staff with any course-related, content-related, or technology-related inquiries. Our office hours are Monday-Thursday, 9-5 CT, and Friday 9-12 CT.

Contact Info:

Phone Number: (661) 874-1655
Email Inquiries: Info@americanwatercollege.org

Additionally, students are encouraged to contact their professor directly with any questions or comments.

Water Transmission and Distribution II

Lesson 1 – Water Meters

Summary Of This Lesson

There are many types of water meters ranging from positive-displacement to magnetic and sonic meters. Each meter has advantages for different situation including corrosive water, large flow volumes, small/occasional flow and more. We will be covering the types of meters and their uses as well as installation and maintenance in this lesson.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- The importance of metering water entering the distribution system, as well as water used by customers
- The basic operating principles of meters commonly used in water systems
- Factors that influence the type and size of meter used for various purposes
- Conditions that influence where meters are located

Assignments For This Lesson

- Read Chapter 12 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 1
- Answer Review Questions
- Complete the quiz for Lesson 1

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Lesson 2 – Backflow Prevention and Cross-Connection Control

Summary Of This Lesson

Cross-connections can lead to nonpotable water entering the distribution system. This can lead to serious consequences if not controlled. Backflow devices are designed to prevent this from happening. This lesson will give you a brief overview backflow prevention and cross-connection control. We will cover the backflow prevention devices and how to how cross-connections occur.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- The public health hazards that are created by cross-connections
- The factors that allow backflow and backsiphonage to occur
- Types of installations or facilities that are likely to have cross-connections
- Appropriate backflow-prevention devices that should be used based on the degree of hazard involved

Assignments For This Lesson

- Read Chapter 13 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 2
- Answer Review Questions
- Complete the quiz for Lesson 2

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Lesson 3 – Water Main Installation

Summary Of This Lesson

Water main installation is one of the most important parts of a distribution system. Improper installation can lead to unnecessary maintenance resulting in frequent loss of service and fire protection as well as higher operating cost. Different pipe materials will have different specific installation guidelines. In this lesson we will cover the general principles of preparation and safety that can be applied to any main installation.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- How pipes and fittings should be handled and prepared for installation
- Methods of excavations for water main installation
- Safety precautions that should be observed during trenching and pipe installation, and methods of preventing trench wall failure
- Procedures to be followed while laying pipe
- Methods of making connections to existing mains
- The importance of blocking and anchoring mains against movement and common restraint methods that are used

Assignments For This Lesson

- Read Chapter 7 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 3
- Answer Review Questions
- Complete the quiz for Lesson 3

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Lesson 4 – Backfilling, Main Testing, and Installation Safety

Summary Of This Lesson

Once the water main has been installed, backfilling, testing for leaks, disinfection, and bacteriological testing must be done to ensure the pipe is ready for use. We will be covering the purpose and methods of backfilling and leak testing the water mains. Then we will cover the disinfection and flushing required before the water main goes online. Lastly, the area should be restored to the state it was before the construction took place, including structures and vegetation.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- The proper methods of backfilling and compacting the backfill in an excavation
- The procedures in pressure and leak testing of new water mains
- The methods of flushing and disinfecting newly constructed or repaired water mains
- Restoration of structures and vegetation following construction
- Safety precautions that must be followed on a construction site to protect worker and the public

Assignments For This Lesson

- Read Chapter 7 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 4
- Answer Review Questions
- Complete the quiz for Lesson 4

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Lesson 5 – System Operations

Summary Of This Lesson

There are two primary objectives of distribution system operations. First is to maintain water quality through the distribution starting from the point of entry and ending at the point of use. Second is to maintain pressure to meet peak demand and fire flow requirements. With these two objectives in mind, we will discuss operational practices and procedures to accomplish these tasks.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- The importance and techniques for maintaining distribution system water quality
- The practices and procedures to ensure system reliability resulting in acceptable pressure at all times and providing adequate flow for all distribution system uses

Assignments For This Lesson

- Read Chapter 2-3 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 5
- Answer Review Questions
- Complete the quiz for Lesson 5

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Lesson 6 – Water Services

Summary Of This Lesson

Water is delivered from the main line to the customer through water service lines. These vary in size and length depending on the connection type and flow required. This lesson will look at the components of a service line, factors governing the size, pipe materials, operating the equipment used for a service tap and record keeping for a service installation.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- What is meant by a service connection
- The components that make up a typical residential connection
- The principal factors that govern the size of water service lines
- Factors that should be evaluated in the selection of pipe materials used for a service connection
- The different types and sizes of connections used to connect service lines
- The use of corporation stops and the different types available
- The method of operating the equipment used in making service taps
- The need for keeping good records of water service installations

Assignments For This Lesson

- Read Chapter 11 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 6
- Answer Review Questions
- Complete the quiz for Lesson 6

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Lesson 7 – Information Management

Summary Of This Lesson

We have gone over the importance of good record keeping, but now we will cover how to manage all the records and other information collected. We will cover typical groups of information, uses of computers, system maps and records for system equipment. All this is important not only for new employees to have access to, but also for the seasoned operators to make informed decisions.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- Typical uses of computers for water system information management
- The importance of maintaining system maps, drawing, and records
- Examples of maps, drawings, and records commonly used in distribution system operations, as well as their purposes
- Records that should be maintained for water distribution system equipment

Assignments For This Lesson

- Read Chapter 19 *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 7
- Answer Review Questions
- Complete the quiz for Lesson 7

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Lesson 8 – System Security and Emergency Response

Summary Of This Lesson

Supplying clean reliable drinking water is something most people take for granted. They rarely stop to think about it until it's not there. Natural disasters like hurricanes, earthquakes, and draughts are just a couple of causes for water shortage or quality concerns. Terror attacks are another threat to be aware of. This lesson will cover the types of emergencies that effect water utilities in the supply or quality of the water and the ways that utilities are vulnerable.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- The types of emergencies that could effect water utilities
- The areas that could make a water utility vulnerable
- The importance of protecting computer systems at a water utility
- The components of a vulnerability assessment

Assignments For This Lesson

- Read Chapter 17 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 8
- Answer Review Questions
- Complete the quiz for Lesson 8

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Lesson 9 – Public Relations

Summary Of This Lesson

Distribution operators are the most important people when it comes to public relations. Operators have more direct contact with the customers and will either instill confidence or distrust in the quality of the water. Happy and confident customers will pay their bills promptly and without complaint. Unhappy customers will complain and resort to drinking bottled water. The media campaigns projects will only be undermined if the operators have poor attitudes toward customers.

Lesson Objectives

Upon completion of this lesson, students will gain an understanding of:

- How public relations enhance a water utility's image
- Specific personal behaviors that improve or detract from customer relations
- Why informed employees are necessary for good public relations
- How written guidelines can assist personnel in maintaining good relations with customers
- Types of formal public relations programs and how they benefit customer awareness and utility operations

Assignments For This Lesson

- Read Chapter 20 in *Water Distribution Operator Training Handbook*
- Watch the video lecture for Lesson 9
- Answer Review Questions
- Complete the quiz for Lesson 9