Course Syllabus

Course Description:

The Basic Water Operations course is intended to provide the necessary training for Texas Water Initial D license and to prepare operators to competently operate a Class D facility. The importance of water system operators cannot be overstated as they work daily to protect the public's health by providing clean and safe drinking water to the people of Texas. It is the highly skilled work of water system operators that ensures that the water systems of Texas are well maintained to provide safe drinking water for years into the future.

The curriculum guidance issued by the Texas Commission on Environmental Quality (TCEQ) in December of 2013 has been followed to ensure this training meets the TCEQ training uniformity standards.

The entirety of this course covers all subject areas listed in the curriculum development guidance issued by the TCEQ for the course Water Distribution. Below is a list of lessons and their learning objectives:

Operator License Requirements
Upon completion of this lesson, the student will:

- Know where rules governing Texas water operator licensing are located
- Have a working knowledge of the requirements for water operator licensing
- Know the key definitions found in the Texas Administrative Code (TAC) regarding water operator licensing

Source Water
Upon completion of this lesson the student will:

- Have a good understanding of the key words and concepts associated with source water
- Have a working understanding of the hydrologic cycle and its various components
- Have a basic understanding of the various forms of water rights
- Have a basic understanding of well construction in various aquifer formations
- Have a working understanding of the various physical, chemical, biological, and radiological contaminants that may be found in source water
- Have a working knowledge of common source water problems and their solutions

Coagulation and Flocculation
Upon completion of this lesson, students will be able to:

- Explain the purpose of coagulation and flocculation in the treatment process
- Explain how coagulants work, and the difference between coagulants and coagulant aids
- Identify the different types of equipment used to feed coagulant chemicals
- Explain the basic design principles of rapid-mix facilities
- Explain how to properly monitor the coagulation and flocculation process for optimal results

Sedimentation
Upon completion of this lesson, students will be able to:

- Identify the different types of sedimentation basins
- Identify and explain the different zones and parts of sedimentation basins
- Explain the principles of tube and plat settlers
- Identify typical problems encountered in operating sedimentation basins
- List the methods for disposing of sedimentation basin sludge

Filtration
Upon completion of this lesson, students will be able to:

- Identify the types of commonly used filtration facilities
- Explain the principle of gravity filter operation
- Explain the differences between pressure filters and gravity filters
- Identify the types of media used in filters
- Explain the purpose of backwashing filters and how backwashing is performed
- Identify the methods of monitoring filter operation
- Identify the principle regulations governing filtration operations
- Identify common filter operating problems

Disinfection
Upon completion of this lesson the student will have a working knowledge of:

- The characteristics of the different disinfecting agents
- The different disinfection methods for water mains
- The different disinfection methods for water storage facilities

Water Storage
Upon completion of this lesson the student will have a working knowledge of:

- The purpose of water storage
- The differences between various types of storage facilities
- How storage facilities are constructed

Distribution Piping
Upon completion of this lesson the student will have a working knowledge of:

- The four main pipe selection considerations
- The construction material and construction characteristics of common pipe use in water distribution systems
- The different pipe joints and their applications

Water Main Installation and Backfilling
Upon completion of this lesson the student will have a working knowledge of:

- Key words and concepts regarding water main installation and backfilling
- The importance of preparation for the job prior to beginning work
- The four general preparation steps that should be taken before any water main installation job
- Trenching principles and safety standards that apply to water main installation
- Pipe inspection and preparation requirements prior to installation
- Proper pie installation techniques, including the installation of thrust restraints
- Proper backfilling methods including soil requirements and compaction

Fire Hydrants and Valves
Upon completion of this lesson the student will have a working knowledge of:

- The construction of the four main types of hydrants
- Gate valve construction and uses
- Globe valve construction and uses
- Ball valve construction and uses
- Butterfly valve construction and uses
- Relief valve construction and uses
- Pressure regulating valve construction and uses
- Air and vacuum relief valve construction and uses
- Altitude valve construction and uses

Cross-Connection Control
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

Pumps and Motors
Upon completion of this lesson the student will have a working knowledge of:

- The construction and operation of velocity type pumps
- The function of the main components of a centrifugal pump
- The theory of operation and common uses of positive displacement pumps
- The differences between the various types of single and three-phase motors

Water Meters
Upon completion of this lesson the student will have a working knowledge of:

- The construction and operation of the different types of water meters
- The normal application of the various water meters
- The various location options available for meter placement
- Meter testing standards and procedures

Safety
Upon completion of this lesson the student will have a working knowledge of:

- Safety related terminology
- Trenching safety requirements
- Confined space safety
- Basic chemical handling safety
- How to set up a traffic diversion

Regulations
Upon completion of this lesson the student will have a good understanding of:

- Why the Safe Drinking Water Act was passed by Congress
- Why amendments to the SDWA were passed

- The classes of Public water systems covered by the act
- The principal requirements of the act
- Special regulation requirements that have been enacted by US EPA

Public Relations
Upon completion of this lesson the student will have a working knowledge 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

Unit Conversions
Upon completion of this lesson the student will be able to:
- Define what a unit is.
- Define what an equivalent is.
- Demonstrate how units and equivalents are used to solve math problems.

Calculating Area
Upon completion of this lesson the student will be able to:
- Demonstrate how to solve for the area of a square
- Demonstrate how to solve for the area of a rectangle
- Demonstrate how to solve for the area of a circle
- Demonstrate how to solve for the area of a triangle

Calculating Volume
Upon completion of this lesson the student will:
- Understand how to calculate trench volume in cubic feet and cubic yards
- Understand how to calculate storage tank volume in gallons
- Understand how to calculate the volume of 1 foot of water depth in a round storage tank

Chemical Feed Problems
Upon completion of this lesson the student will:
- Understand how to calculate the chlorinator setting in pounds per day based on well pumping rate and desired chlorine dose
- Understand how to calculate the chlorine feed rate in pounds per day given the chlorine solution strength in percent and a hypochlorinator flow rate in mL/min
- Understand how to calculate a dry chemical fee rate in pounds per day

Distribution Disinfection Problems
Upon completion of this lesson the student will:
- Be able to calculate chlorine concentrations when mixing chlorine solutions
- Be able to calculate a proper chlorine dose
- Be able to calculate chlorine demand

Storage Tank Problems

Upon completion of this lesson the student will:

- Be able to calculate detention time
- Be able to calculate time to fill or empty a tank
- Be able to calculate water depth change in a tank

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

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General Course Inquiries: Info@americanwatercollege.org