



Course Syllabus

Course Description:

The **Basic Wastewater Operation** course is intended to provide the necessary training for Texas Wastewater System Operators to competently operate wastewater treatment plants. Topics covered will help the operator to safely operate equipment and handle chemicals during the normal course of his or her job. The importance of wastewater system operators cannot be overstated as they work daily to protect the public's health and the environment by treating wastewater prior to discharge. It is the highly skilled work of wastewater system operators that ensures that the wastewater collection systems and treatment plants of Texas are well maintained and properly operated to achieve the treatment and regulatory goals and objectives

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:

Wastewater Treatment Plant and Collection System Operators

Upon completion of this lesson, the student will:

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

General Goals of Wastewater Collection and Treatment

Upon completion of this lesson the student will:

- Have a good understanding of the key words and concepts associated with Wastewater Collection and Treatment
- Understand the role wastewater collection and treatment plays in protecting Water as a Resource
- Understand the Bodies of Water are Protected by wastewater collection and treatment
- Understand the two Waste Source Categories

The Role of the Wastewater Operator

Upon completion of this lesson, students will:

- Have a working knowledge of The Operator's Responsibility
- Have a working knowledge of The Operator's Role
- Have a working knowledge of The Clean Water Act of 1972
- Have a working knowledge of TCEQ Functions and Duties
- Have a working knowledge of the Local Governments Functions and Duties

Characterization of Wastewater

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

- Define wastewater characterization key vocabulary words
- Recall the three main classifications used to describe the source of wastewater
- Describe the key details about Physical Characteristics of wastewater
- Describe the key details about Chemical Characteristics of wastewater
- Describe the key details about Biological Characteristics of wastewater

Sampling Wastewater

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

- Define wastewater sampling vocabulary words
- Explain the reasons for sampling
- Discuss the Equipment used for sampling

Preliminary Treatment

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

- Define preliminary treatment vocabulary words
- Discuss what the purpose of preliminary treatment is
- Express preliminary treatment components
- Discuss the benefits of pre-aeration of wastewater

Primary Treatment

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

- Define primary treatment vocabulary words
- Discuss the purpose of primary treatment
- Discuss the components of primary treatment and how they operate
- Recall safety associated with the primary treatment

Trickling Filters

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

- Define activated sludge vocabulary words
- Discuss trickling filter designs
- Describe the process and equipment

Rotating Biological Contactors

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

- Define Rotating Biological Contactors vocabulary words
- Describe the Rotating Biological Contactors equipment and process control
- Recall common troubleshooting situations

Wastewater Ponds

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

- Define pond treatment vocabulary words
- Discuss the purpose of pond treatment
- Express what is involved in the pond treatment process
- Discuss the classification of waste treatment ponds
- Recall the advantages and disadvantages of pond treatment

Disinfection

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

- Define disinfection vocabulary words
- Discuss the purpose of disinfection
- Discuss breakpoint chlorination
- Identify the hazards of chlorine
- Discuss safe handling practices of chlorine

Anaerobic Sludge Digestion

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

- Key words and concepts regarding Anaerobic Sludge Digestion
- Process Description
- Process Control
- Digester Performance
- Volatile Acid/Alkalinity

Aerobic Sludge Digestion

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

- The difference between Anaerobic and Aerobic Sludge Digestion
- Identify the different Aerobic Digestion Factors

Sludge Dewatering

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

- Define Sludge Dewatering vocabulary words
- Define the principles of operation and factors affecting belt press operation
- Define the principles of operation and factors affecting centrifuge operation

Unit Conversions

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

- Define what a unit is.
- Define what an equivalent is.
- Demonstrate how units and equivalents are used to solve math problems.

Problem Solving

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

- Define the five steps to problem solving
- Determine if all five steps are needed to solve a specific problem
- Explain how the five steps work
- Apply the five step problem solving method to water math problems

Calculating Volume

Upon completion of this lesson the student will:

- Demonstrate how to solve for the volume of a cube
- Demonstrate how to solve for the volume of a cylinder
- Demonstrate how to solve for the volume of a cone
- Demonstrate how to solve for the volume of a sphere

Clarifier Problems

Upon completion of this lesson the student will:

- Define what a clarifier is
- Explain what a clarifier does
- Demonstrate how solve detention time problems
- Demonstrate how to solve surfacing loading problems
- Demonstrate how to solve weir overflow problems
- Demonstrate how to solve solids loading problems
- Define what units are used in each of the above listed problem types

Wastewater Disinfection Problems

Upon completion of this lesson the student will:

- Demonstrate how to solve residual problems
- Demonstrate how to solve chlorinator setting problems

Activated Sludge Problems

Upon completion of this lesson the student will:

- Be able to calculate the Sludge Volume Index
- Be able to calculate the weight of solids in the aeration basin
- Be able to calculate lbs/day of BOD applied to the aeration basin
- Be able to calculate sludge age in days

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