

Small Wastewater System Operation and Maintenance, Volume 1
A—Introduction, Safety, and Decentralized Components
California State University, Sacramento
(3.1 Continuing Education Units)

COURSE DESCRIPTION

This course is designed to train operators in the practical aspects of operating and maintaining wastewater system equipment and processes suited to systems that service communities with populations of 10,000 people or fewer and average daily wastewater flows of no more than 1 million gallons per day. This course presents an overview of small systems conveyance and treatment equipment, processes, and regulations; procedures for the safe operation of equipment and processes; and procedures for the operation and maintenance of common components of decentralized systems, including septic tanks, pumping systems, and subsurface wastewater infiltration systems.

COURSE OUTLINE

This course trains operators to safely and effectively operate and maintain wastewater system components that are suitable for small wastewater systems.

Chapter 1, Small Collection, Treatment, and Discharge Systems

Learning Objectives

1. Describe types of pollutants found in wastewater and explain the reasons to prevent discharging them, including regulatory prohibitions.
2. Explain the purposes of on-site systems and small wastewater collection, treatment, and discharge systems.
3. Identify and describe the types of treatment processes and collection systems commonly used in small wastewater treatment systems.
4. List the various aspects of small wastewater treatment operator jobs.

The main purposes of this chapter are to give an overview of small wastewater systems and their safe and effective operation and maintenance.

Chapter 2, Safety

Learning Objectives

1. Discuss key aspects of workplace safety, including the importance of safety programs, accident prevention, and hazard communication.
2. Describe the importance and use of personal protective equipment.
3. Describe how to safely address common hazards, such as physical hazards, atmospheric hazards, confined spaces, hazardous materials, fires, and electric shock.
4. Discuss the specific hazards associated with facility maintenance, vehicles, and excavation.
5. Recognize the special safety concerns of decentralized system operators.

The main purpose of this chapter is to train operators in procedures and practices to safely work in small wastewater systems.

Chapter 3, Decentralized System Components

Learning Objectives

1. Explain the treatment process, proper use, maintenance, and troubleshooting of septic tanks.
2. Describe the main components, operation, and maintenance of decentralized pumping systems.
3. Explain the important considerations of field maintenance, including legal considerations.
4. Describe the operation and maintenance of various subsurface wastewater infiltration systems.
5. Describe effective troubleshooting procedures.

The main purpose of this chapter is to train operators in the safe and effective operation and maintenance of treatment processes used in decentralized wastewater systems.

TIME ASSIGNMENT

Text pages: The content from the training manual used in this course, *Small Wastewater System Operation and Maintenance*, Volume 1, includes 262 pages. The average word count on a page from the training manual is 525 words. The training manual used for this course contains text, tables, graphs, illustrations, math example problems, section questions, and chapter review questions to enhance the presentation of information and the student learning experience. The course is designed for students to spend the same amount of time reading the tables, graphs, and illustrations as they spend reading the equivalent amount of related chapter text. Therefore, each page is assumed to contain the equivalent of 524 words. The average reading speed is 130 words per minute; therefore, each page is projected to require 4 minutes of student time for each reading.

Math example problems: The course contains 1 math example problem. The projected average time to solve each math problem is 3 minutes.

Section questions: The course contains 160 section questions, located in the “Check Your Understanding” sections integrated throughout the chapter text. These questions enable students to self-assess their understanding of a section’s material before proceeding to the next section. The projected average response time is 2 minutes per question.

Chapter review questions: The course contains 150 review questions, located in the “Chapter Review” at the end of each chapter. Question types include fill-in, multiple choice, and matching. The projected average response time is 2 minutes per question.

Objective test questions: The course contains 150 test questions. There is 1 objective test per chapter. The projected average response time is 2 minutes per question.

Course component	Number of component units	Minutes required to complete component unit	Total time assignment for component
Text pages	262 ×	4 =	1,048
Math example problems	1 ×	3 =	3
Section questions	160 ×	2 =	320
Chapter review questions	105 ×	2 =	210
Objective test questions	150 ×	2 =	300
			1,881 minutes

