

**Operation of Wastewater Treatment Plants, Volume 1**  
**B—Secondary Treatment**  
**Office of Water Programs**  
**California State University, Sacramento**  
**(3.6 Continuing Education Units)**

**COURSE DESCRIPTION**

This course trains operators in the practical aspects of operating and maintaining two secondary treatment processes: activated sludge processes and fixed film systems. This course uses the following chapters from *Operation of Wastewater Treatment Plants, Volume 1*: Chapter 5, “Activated Sludge Processes (Secondary Treatment)” and Chapter 6, “Fixed Film Processes.” The information in this course provides operators with an understanding of basic operation and maintenance concepts and an ability to analyze and solve problems when they occur on the job. The procedures and concepts discussed in this course can be adapted to fit the needs of different plants.

**COURSE OUTLINE**

The course uses selected chapters from the training manual, *Operation of Wastewater Treatment Plants, Volume 1*.

**Chapter 5, Activated Sludge Systems (Secondary Treatment)**

*Learning Objectives*

1. Operate activated sludge processes, including determining process loadings and applying operating parameters, ranges, and guidelines.
2. Schedule and conduct operation and maintenance duties, such as adjusting treatment processes, performing laboratory testing and microscopic observation, and keeping records.
3. Safely operate, inspect, start up, and shut down activated sludge processes.
4. Identify factors that cause abnormal operation in the activated sludge process and take corrective action.
5. Become familiar with the purpose of common process modifications to the conventional activated sludge process.
6. Understand how to review engineering drawings and specifications for the activated sludge facility.

The main purpose of this chapter is to train operators in the basic operation and maintenance of activated sludge systems at wastewater treatment plants.

**Chapter 6, Fixed Film Processes (Secondary Treatment)**

*Learning Objectives*

1. Explain fixed film processes and their use in stand-alone and combined process systems.
2. Use fixed film key operating parameters to successfully monitor and control fixed film processes.
3. Safely operate, shut down, and start up fixed film treatment units.
4. Identify operational problems or abnormal operations in fixed film processes using observations and lab results and take corrective measures.

The main purpose of this chapter is to train operators in the basic operation and maintenance of fixed film processes at wastewater treatment plants.

## TIME ASSIGNMENT

**Text pages:** The content from the training manual used in this course, *Operation of Wastewater Treatment Plants, Volume 1*, includes 338 pages. The average word count on a page from the training manual is 526 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 526 words. The average reading speed is 130 words per minute; therefore, each page is projected to require four minutes of student time for each reading.

**Math example problems:** The course contains 16 math example problems. The projected average time to solve each math problem is three minutes.

**Section questions:** The course contains 192 section questions, located in the “Check Your Understanding” sections integrated throughout the chapter text. These questions enable student 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 95 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 90 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	338 ×	4 =	1,352
Math example problems	16 ×	3 =	48
Section questions	192 ×	2 =	384
Chapter review questions	95 ×	2 =	190
Objective test questions	90 ×	2 =	180
			<b>2,154 minutes</b>
			<b>35.9 or 36 hours</b>