

# OPERATOR TRAINING OPPORTUNITIES

Catalog | 2023

# PURCHASING TRAINING MATERIALS/ COURSE ENROLLMENTS

## Online

[owp.csus.edu](http://owp.csus.edu)

## Phone

916. 278. 6142

## Walk-in

3020 State University Drive  
Modoc Hall, Suite 1001  
Sacramento, CA 95819

Monday–Friday

8 am – 12 pm, 12:30 pm – 4 pm PST

Closed Saturday and Sunday

*Check our website for  
the latest information  
on office hours.*

## Payment Options

We accept all major credit cards. To pay for an order with a purchase order, check, or money order, download our order form at [owp.csus.edu/order-form](http://owp.csus.edu/order-form). Submit your completed form and payment information by:

## Mail

Office of Water Programs  
California State University, Sacramento  
6000 J Street, Modoc Hall 1001, MS 6025  
Sacramento, CA 95819

## Fax

916. 278. 5959

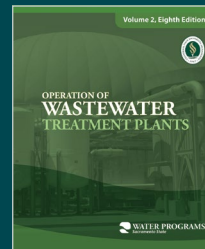
## Email

[wateroffice@owp.csus.edu](mailto:wateroffice@owp.csus.edu)

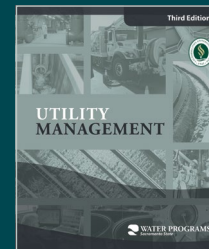
## Return/Cancellation Policy

See our full return policy at [www.owp.csus.edu/policy/return.php](http://www.owp.csus.edu/policy/return.php). Returns must be preapproved by OWP and received within 14 days of the purchase date (other conditions apply). Course enrollments may be canceled and refunded within 5 days of the purchase date (other conditions apply).

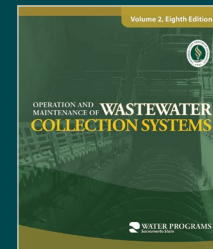
# LATEST EDITIONS AND COURSES



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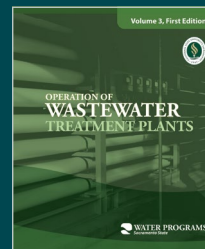


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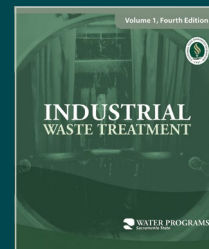


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## Coming Soon



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## Features

- Chapter review sections
- Expanded explanations of math concepts and step-by-step example problems
- Updated, full-color photos and illustrations
- Includes 6 months of eText access with manual purchase

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*

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## Course Time Limits

Course Type	Time Limit
Courses earning 0.6 – 3.0 CEUs	3 months from enrollment date
Courses earning 3.1 – 9.0 CEUs Academic credit courses	6 months from enrollment date
Online math courses earning 1.8 – 3.3 CEUs	6 months from enrollment date

When enrolling in a course, you will receive information about the time limit for completing the course. [Each manual, online course, or video is a separate course.](#) If you enroll in more than one course at the same time, the time limits apply to each course separately and begin at the time of enrollment.



**WATER TREATMENT  
& DISTRIBUTION**

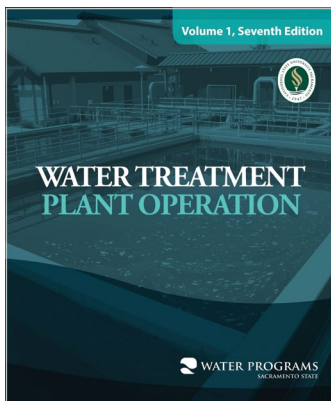
# Water Treatment Plant Operation

## Vol 1, Seventh Edition

Courses train operators to safely and effectively operate and maintain drinking water treatment plants.

Manual  
**\$100 (Includes eText)**  
Enrollment  
**\$75 (9 CEUs)**

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*



- 1 Introduction to Water Treatment
- 2 Source Water, Reservoir Management, and Intake Structures
- 3 Coagulation and Flocculation
- 4 Sedimentation
- 5 Filtration
- 6 Disinfection
- 7 Corrosion Control
- 8 Taste and Odor Control
- 9 Laboratory Procedures

Appendix A: Introduction to Basic Math for Operators

Answer Key, Glossary, Index

*Instructor guides for water series courses available for \$35 to qualified instructors. Call for ordering information.*

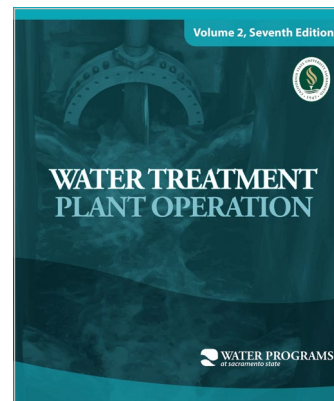
# Water Treatment Plant Operation

## Vol 2, Seventh Edition

Course provides operators with the knowledge and skills to properly install, inspect, operate, maintain, and manage water treatment plant systems.

Manual  
**\$100 (Includes eText)**  
Enrollment  
**\$75 (9 CEUs)**

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*



- 1 Producing Safe Water in a Safe Workplace
- 2 Softening
- 3 Specialized Treatment Processes
- 4 Fluoridation
- 5 Membrane Treatment Processes
- 6 Process Wastes
- 7 Instrumentation and Control Systems
- 8 Plant Maintenance
- 9 Management

Appendix A: Introduction to Basic Math for Operators

Answer Key, Glossary, Index

*eLearning math course available!  
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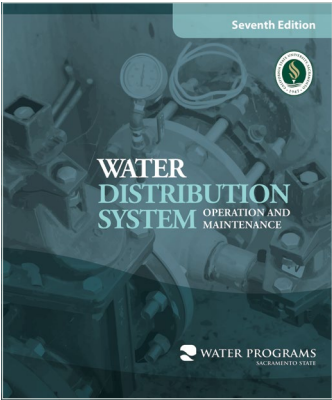
# Water Distribution System Operation and Maintenance

Seventh Edition

This course trains operators to safely and effectively operate and maintain drinking water distribution systems.

Manual  
**\$100 (Includes eText)**  
  
Enrollment  
**\$75 (9 CEUs)**

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1	Introduction to Water Distribution
2	Water Storage Facilities
3	Distribution System Facilities
4	Operation and Maintenance
5	Disinfection
6	Safety
7	Management
Appendix A: Introduction to Basic Math for Operators	
Answer Key, Glossary, Index	

Instructor guides for water series courses available for \$35 to qualified instructors. Call for ordering information.

**eLearning math course available!**  
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# Water Distribution System eLearning Courses

eLearning courses feature guided reading assignments, self-assessment questions to help you check your understanding, interactive exercises, video clips, and online resources. The related training manual, *Water Distribution System Operation and Maintenance*, Seventh Edition, is sold separately.

**Online Enrollment — \$100 each (1.8 CEUs per course)**



## 703A Safety

Topics include operator responsibilities; safety programs; safe operation and maintenance of pumps, wells, vehicles, and equipment; traffic routing; working in streets; protecting the public; and conducting waterworks safety inspections.



## 703B Distribution Facilities

Topics include facility types, purposes, and locations; inspections; troubleshooting; disinfection; corrosion protection; system hydraulics; meters; backflow prevention devices; and recordkeeping.



## 703C Disinfection

Topics include disinfecting wells, pumps, mains, and storage facilities; operating and maintaining hypochlorinators and chlorinators; troubleshooting chlorination systems; and conducting a chlorine safety program.



## 703D Operation & Maintenance

Topics include safe operation and maintenance; system surveillance, water quality monitoring, and cross-connection control programs; locating buried pipes and repairing leaks; pipe connections; pipe flushing and cleaning; thawing frozen pipes and hydrants; meter testing; disinfecting mains and storage facilities; recordkeeping; and emergency response.



## 703E Management

Topics include emergency planning; developing an organization chart; writing job descriptions and interview questions; conducting employee evaluations; ensuring equal and fair treatment to employees; financial planning; setting up a safety program; and records management.

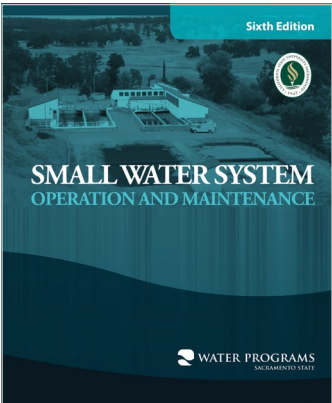
# Small Water System Operation and Maintenance

Sixth Edition

This course is designed to train operators in the safe and effective operation and maintenance of small water systems and treatment plants. Materials focus on wells, pumps, disinfection, and small water treatment plants serving populations of fewer than 10,000.

Manual  
\$100 (Includes eText)  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1	Introduction to Small Water Systems
2	Wells
3	Small Water Treatment Plants
4	Disinfection
5	Safety
6	Laboratory Procedures
7	Introduction to Small System Management
	Appendix A: Introduction to Basic Math for Operators
	Answer Key, Glossary, Index

Instructor guides for water series courses available for \$35 to qualified instructors. Call for ordering information.

# Small Water Systems eLearning Courses

eLearning courses feature guided reading assignments, self-assessment questions to help you check your understanding, interactive exercises, video clips, and online resources. The related training manual, *Small Water System Operation and Maintenance*, Sixth Edition, is sold separately.

Online Enrollment — \$100 each (1.8 CEUs per course)



**702A Wells**  
Topics include wellhead protection; well and pump system components; maintenance; pump and tank operation; inspection; disinfection; recordkeeping; sand removal; troubleshooting; site selection; evaluation and testing; drilling methods; and well plugging.



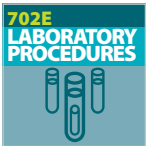
**702B Treatment Plants**  
Topics include treatment requirements and methods for surface and groundwaters; coagulation; flocculation; sedimentation; filtration; disinfection; corrosion control; solids-contact clarification; sand filters; mineral removal; maintenance; and safety.



**702C Disinfection**  
Topics include water supply system components; hydrologic cycle; sanitary survey methods; regulations; effectiveness; physical and chemical methods; applicability of disinfection to various types of equipment; chlorination rates; chlorine residual measurement; safety; and applied math solution techniques.



**702D Safety**  
Topics include safety program implementation; equipment use; safe practices; lockout/tagout procedures; inspections; and water rate determination, calculation, and administration.



**702E Laboratory Procedures**  
Topics include operator responsibilities; certification requirements; basic laboratory analysis procedures and equipment; sampling techniques and devices; tests (alkalinity, hardness, coliform bacteria counts, jar tests, and others); and applied math problems and solutions.

# Small Water Systems Video Information Series

This 10-topic DVD (20 to 60 minutes each) is designed to serve the needs of operators, managers, owners, and elected board members of small water systems. The material focuses on the basic operation and maintenance of small groundwater and surface water supply systems and water distribution systems.

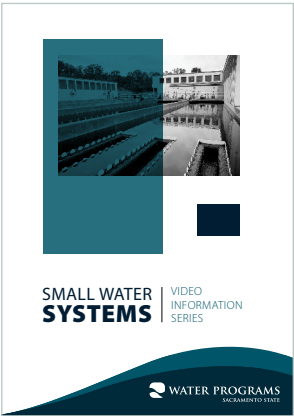
Course Package (enrollment, DVD set, and learning booklet)—**\$175**

DVD Set (with learning booklet)—**\$100**

Enrollment—**\$75 (3 CEUs)**

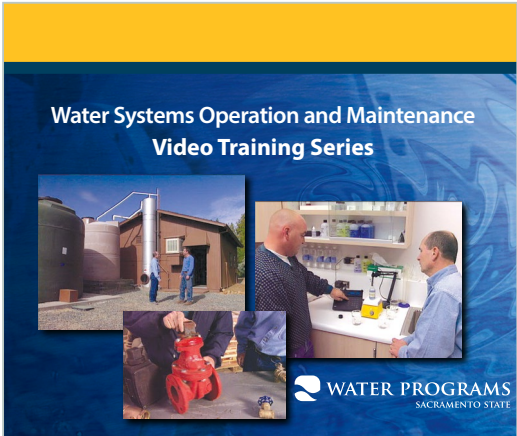
Supplemental Learning Booklet—**\$49**

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



# Water Systems Operation and Maintenance Video Training Series

This 7-topic DVD presents instruction from working operators, engineers, and managers who are experts in their fields and features operators performing duties at their facilities.



## Video Topics

Wellhead Protection

Hypochlorination

Water Storage Tanks

Sampling and Testing

Inspecting a Pump Station

Distribution Systems

Approaches to Compliance with Standards

Course Package (enrollment, DVD set, and learning booklet)—**\$175**

DVD Set (with learning booklet)—**\$100**

Enrollment—**\$75 (3 CEUs)**

Supplemental Learning Booklet—**\$49**

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)

## Video Topics

Roles and Responsibilities of Operators, Managers, Owners, and Elected Board Members

Surface Water Treatment, Part 1

Surface Water Treatment, Part 2

Groundwater Treatment, Part 1

Groundwater Treatment, Part 2

Storage and Distribution

Monitoring

Managerial Responsibilities

Financial Considerations

Emergency Preparedness



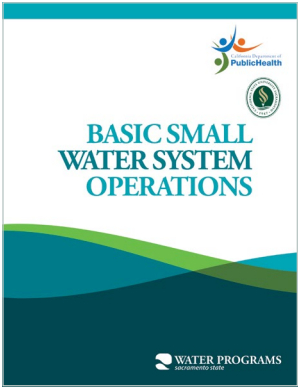
# Basic Small Water System Operations

Water supply systems vary among towns, cities, and regions. This manual serves as a resource book for small water systems, providing an overview of the basic operation and maintenance of these systems.

This manual can be used to prepare for further study and a career in the operation and maintenance of water treatment and distribution facilities.

If used in conjunction with a test administered by the California State Water Resources Control Board, the manual can also be used to satisfy the high school diploma requirement for admittance into the California drinking water certified operator examinations.

For more information about this opportunity, call (916) 449-5642 or email [dwopcertprogram@waterboards.ca.gov](mailto:dwopcertprogram@waterboards.ca.gov).



Manual — \$30

- 1 Roles and Responsibilities of Operators
- 2 Sources of Water
- 3 Wells
- 4 Small Water Treatment Plants
- 5 Water Storage and Distribution
- 6 Drinking Water Laws and Regulations
- 7 Math for Small Water System Operators

Appendix: Practice Test and Suggested Answers, Words, Index



# WASTEWATER TREATMENT & COLLECTION

# Improving Learning Pathways and Options

To offer students a clearer learning pathway that mirrors the experience of many operators as they progress in their careers from operator-in-training to lead operator to utility manager, OWP substantially revised the popular Operation of Wastewater Treatment Plants series. The series is now 3 volumes and highlights different aspects of wastewater treatment:

- **Volume 1** covers treatment of liquids, including preliminary, primary, and secondary treatment, as well as disinfection and laboratory procedures.
- **Volume 2** presents information on nutrient removal, treatment and handling of solids, and plant maintenance.
- **Volume 3** discusses effluent discharge and reuse as well as plant-wide processes and procedures, such as odor control, instrumentation, and utility management.

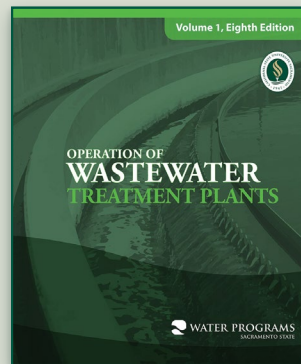
We also created multiple, shorter correspondence courses with fewer continuing education units (CEUs) based on selected chapters from each volume. The new courses offer operators a stepwise approach to obtaining or maintaining professional certifications, as well as the opportunity to focus their learning on the topics most applicable to their jobs or aspirations.

An operator-in-training can take “Volume 1, Course A—Safety, Beginning Treatment, and Lagoon Systems” as part of their entry-level certification and learn to run preliminary and primary treatment processes. Alternately, a more experienced operator who is applying to become an activated sludge process specialist can start with “Volume 1, Course B—Secondary Treatment,” which covers that treatment process in detail.

More information about all 3 volumes and their associated courses appears on pages 20, 22, and 23.

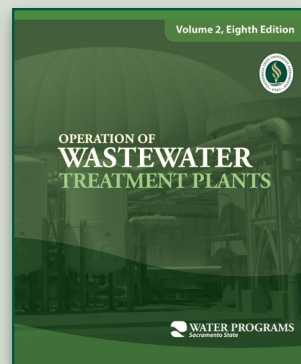
*Look for multiple courses for most new editions of OWP training manuals.*

**More information at:**  
[owp.csus.edu/courses/wastewater.php](http://owp.csus.edu/courses/wastewater.php) >



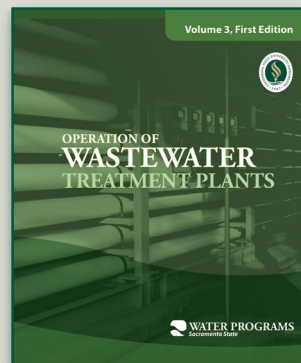
## Operation of Wastewater Treatment Plants, Vol 1

- Treatment of liquids
- Preliminary, primary, and secondary treatment
- Disinfection
- Laboratory procedures



## Operation of Wastewater Treatment Plants, Vol 2

- Nutrient removal
- Solids and handling
- Plant maintenance



## Operation of Wastewater Treatment Plants, Vol 3

- Effluent discharge and reuse
- Odor control
- Instrumentation
- Utility management
- Other plant-wide processes and procedures

# Operation of Wastewater Treatment Plants

## Vol 1, Eighth Edition

Courses are designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants. Volume 1 focuses on treatment methods for liquid wastes and how to analyze and solve operational problems.

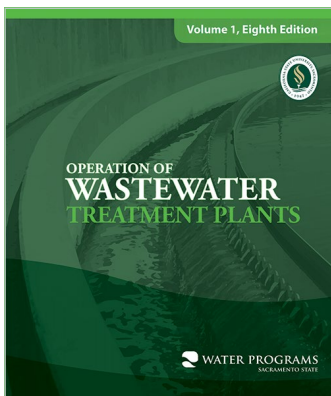
Manual—\$100 (Includes eText)

Enrollment A—\$30 (4 CEUs)  
Safety, Beginning Treatment, and  
Lagoon Systems

Enrollment B—\$30 (3.6 CEUs)  
Secondary Treatment

Enrollment C—\$30 (4.3 CEUs)  
Disinfection, Laboratory  
Procedures, and Math

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1 Introduction to Wastewater Treatment

2 Safety

3 Preliminary Treatment

4 Primary Treatment

5 Activated Sludge Systems (Secondary Treatment)

6 Fixed Film Processes (Secondary Treatment)

7 Disinfection

8 Lagoon Systems

9 Laboratory Procedures

Appendix A: Introduction to Basic Math for Operators

Answer Key, Glossary, Index

Instructor guides for wastewater series courses available for \$35  
to qualified instructors. Call for ordering information.

# Operation of Wastewater Treatment Plants eLearning Courses

These courses are based on the required training manual title: *Operation of Wastewater Treatment Plants, Volume I, Eighth Edition*, which is sold separately.

All courses are online and feature guided reading assignments, self-assessment questions, interactive exercises, videos, and online resources. The readings and student exercises integrate with the online materials.

(Note to Texas and Washington operators: Your states require that your exams be proctored and that an affidavit be signed by your proctor. After purchase, you will receive detailed proctoring instructions.)

## NEW COURSES COMING SOON!



### Preliminary and Primary Treatment

This course provides an introduction to wastewater treatment operation and maintenance and to the facilities that treat wastewater. It also provides in-depth discussion of preliminary and primary wastewater treatment facility operation and maintenance.



### Activated Sludge 1

This course focuses on activated sludge systems in normal operations, including process description, control strategies and procedures, and performance monitoring.



### Activated Sludge 2

This course focuses on less common activated sludge process operations, including causes and symptoms of abnormal operation, troubleshooting, and startup and shutdown. Equipment maintenance topics are also covered.



### Fixed Film Processes

This course covers operation and maintenance of fixed film biological wastewater treatment processes. Facility types covered include trickling filters and rotating biological contactors. Topics covered include operational theory, startup and shutdown, operational strategy, loading criteria, and system sampling and monitoring.



### Disinfection

This course covers operation and maintenance of disinfection treatment processes with an emphasis on chlorination systems. All common types of chlorination systems are included, along with operation and maintenance of dechlorination systems. Other disinfection processes covered include ultraviolet and ozone treatment.



### Lagoon Systems

This course covers the classifications and applications of lagoon systems as well as their operation and maintenance and troubleshooting and sampling procedures.

# Operation of Wastewater Treatment Plants

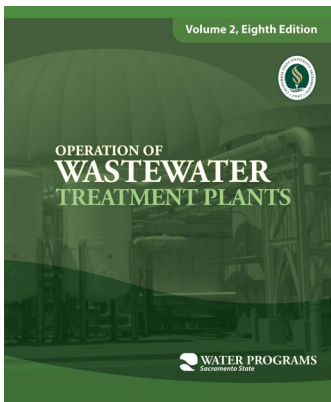
## Vol 2, Eighth Edition

Courses are designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants. Volume 2 focuses on treating, handling, and disposing of solids in wastewater.

Manual—\$100 (Includes eText)

Enrollment A—\$40 (3.5 CEUs)  
Treatment Plants and Tertiary Treatment

Enrollment B—\$40 (4 CEUs)  
Solids Management and Plant Maintenance



- 1 Introduction to Wastewater Treatment
- 2 Nutrient Removal (Tertiary Treatment)
- 3 Solids Removal from Effluent (Tertiary Treatment)
- 4 Residual Solids Management
- 5 Plant Maintenance

Appendix A: Introduction to Basic Math for Operators

Answer Key, Glossary, Index

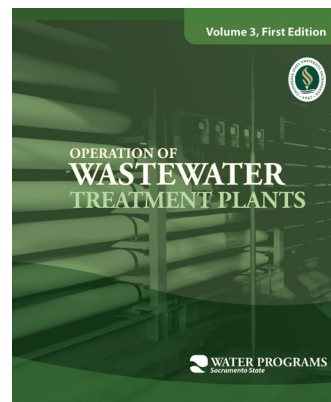
*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

COMING SOON!

# Operation of Wastewater Treatment Plants

## Vol 3, First Edition

This manual replaces *Advanced Water Treatment*. Courses are designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants. Volume 3 focuses on effluent discharge and reuse, odor control, instrumentation, and utility management.



Manual—\$100 (Includes eText)

Enrollment A—\$40 (2.3 CEUs)  
Introduction, Effluent Discharge and Reuse, and Odor Control

Enrollment B—\$40 (3.5 CEUs)  
Instrumentation and Utility Management

- 1 Introduction to Wastewater Treatment
- 2 Effluent Discharge and Reuse
- 3 Odor Control
- 4 Instrumentation and Control
- 5 Introduction to Wastewater Utility Management

Appendix A: Introduction to Basic Math for Operators

Answer Key, Glossary, Index

*eLearning math course available!*  
*See page 45*

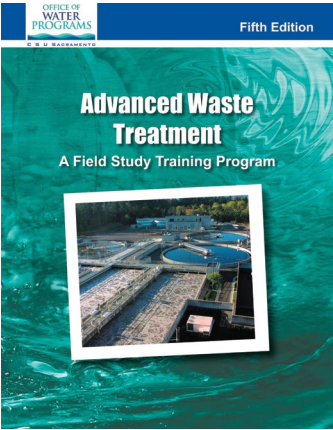
# Advanced Waste Treatment

Fifth Edition

This course is part of the Operation of Wastewater Treatment Plants series, covering biological, physical, chemical, and advanced waste treatment processes.

Manual  
\$49  
  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



- |   |   |
|---|---|
| 1 | Odor Control  |
| 2 | Activated Sludge (Pure Oxygen Plants and Operational Control Options) |
| 3 | Residual Solids Management  |
| 4 | Solids Removal from Secondary Effluents                               |
| 5 | Phosphorus Removal  |
| 6 | Nitrogen Removal  |
| 7 | Enhanced Biological (Nutrient) Control                                |
| 8 | Wastewater Reclamation and Reuse                                      |
| 9 | Instrumentation and Control Systems                                   |

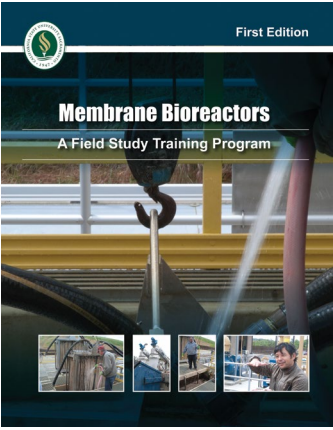
Appendix: Comprehensive Review Questions, Words, Index

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

# Membrane Bioreactors

First Edition

This course describes the membrane bioreactor (MBR) wastewater treatment process; explains how to operate, maintain, and troubleshoot the process; stresses safe procedures for cost-effective O&M; and helps operators develop strategies to correct MBR failures. Procedures are provided for implementing a comprehensive startup, commissioning, and training phase prior to the complete transfer of an MBR plant to the O&M staff.



- |   |                                    |
|---|------------------------------------|
| 1 | Membrane Bioreactor (MBR) Overview |
| 2 | MBR Facilities                     |
| 3 | Operation of the MBR Process       |
| 4 | Process Control                    |
| 5 | Maintenance                        |
| 6 | MBR Startup and Commissioning      |
| 7 | MBR Plant Safety                   |

Appendix: Comprehensive Review Questions, Index

Manual  
\$33  
  
Enrollment  
\$75 (1 CEU)



# Operation and Maintenance of Wastewater Collection Systems

## Vol 1, Eighth Edition

These courses are designed to train new and current operators in the safe and effective operation and maintenance of wastewater collection systems. Volume 1 focuses on tasks performed by line maintenance crews and covers various types of collection systems and construction inspection.

Manual  
**\$100 (Includes eText)**  
  
Enrollment  
**\$75 (9 CEUs)**

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*

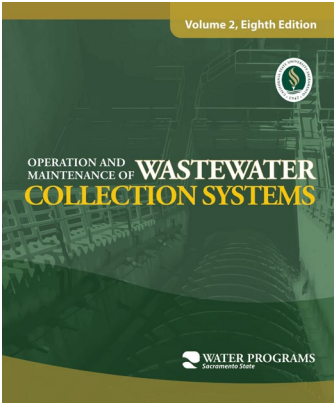
1	Introduction to Wastewater Collection
2	Wastewater Collection Systems: Purpose, Components, and Design
3	Safe Procedures
4	Inspecting and Testing Collection Systems
5	Pipeline Cleaning and Maintenance Methods
6	Underground Repair and Construction
Appendix A: Introduction to Basic Math for Operators	
Answer Key, Glossary, Index	

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

# Operation and Maintenance of Wastewater Collection Systems

## Vol 2, Eighth Edition

Volume 2 focuses on lift stations, maintenance, and system administration.



Manual  
**\$100 (Includes eText)**  
  
Enrollment  
**\$75 (6.4 CEUs)**

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*

1	Introduction to CMOM
2	Lift Stations
3	Equipment Maintenance
4	Rehabilitation
5	Management
Appendix A: Introduction to Basic Math for Operators	
Answer Key, Glossary, Index	

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

*eLearning math course available!  
See page 45*

# Collection Systems: Methods for Evaluating and Improving Performance

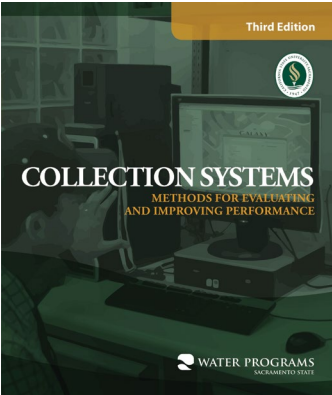
Third Edition

This course can assist collection system agencies in evaluating the effectiveness of their O&M program and identifying areas for improvement.

Manual  
\$80 (Includes eText)

Enrollment  
\$75 (3 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



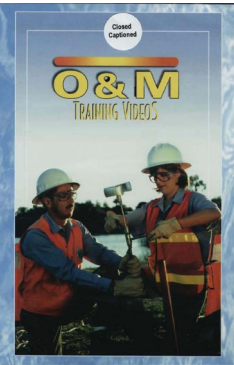
1	Understanding Wastewater Collection System Problems and Needs
2	Researching Trends in Collection System Performance
3	Developing Benchmark Data
4	Developing, Analyzing, and Interpreting O&M Performance Indicators
5	Improving Collection System Performance
6	Case Histories and Benchmarking Surveys
7	How Has Performance Improved?
	Appendix A: Literature Review
	Appendix B: Data Collection Forms
	Appendix C: Benchmarking Worksheets
	Answer Key, Glossary, Index

Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.

# Collection Systems Operation and Maintenance Training Videos

This 6-topic DVD (30 minutes each) is designed for training potential, new, and experienced collection system operators working with both wastewater and combined collection systems. Each video demonstrates the equipment and procedures collection system crews use to safely and effectively operate and maintain their systems. Operators will learn how to properly identify, solve, and document solutions to existing and potential collection system problems.

DVD—\$100  
Enrollment—\$75 (0.6 CEUs per course)



## Video Topics

Guardians of Health
Importance of Operators, Inspection, and Testing
TV Stars
Closed-Circuit Television Inspection
Pipe Detectives
Pipeline Cleaning and Maintenance Methods
Way Makers
Pipeline Cleaning and Chemical Control
Flow Movers
Operation of Wastewater Lift Stations
Motor Specialists
Maintenance of Wastewater Lift Stations

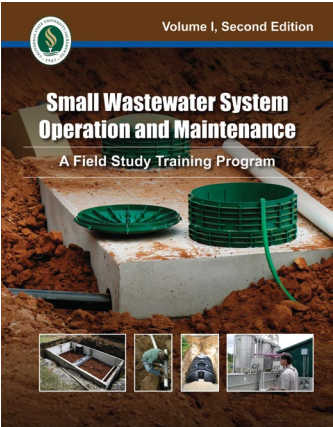
# Small Wastewater System Operation and Maintenance

## Vol 1, Second Edition

These courses focus on the practical, hands-on aspects of safely operating and maintaining small community wastewater collection, treatment, and effluent discharge systems, as well as several types of package wastewater treatment processes.

Manual  
\$49  
  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1	The Small Wastewater System Operator
2	Small Collection, Treatment, and Discharge Systems
3	Safety
4	Septic Tanks and Pumping Systems
5	Wastewater Treatment and Effluent Discharge Methods
6	Collection Systems
7	Maintenance and Troubleshooting
8	Setting Rates for Small Wastewater Utilities
Appendix: Comprehensive Review Questions, Arithmetic, Words, Index	

Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.

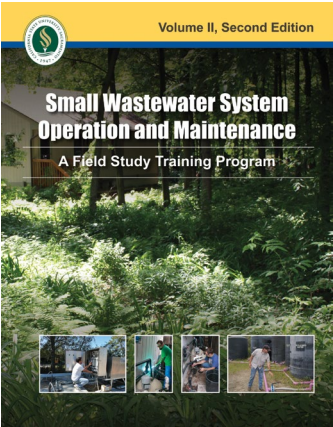
# Small Wastewater System Operation and Maintenance

## Vol 2, Second Edition

Volume 2 is designed to train operators in the daily practices of safely operating and maintaining small wastewater treatment and disposal systems.

Manual  
\$49  
  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



9	Wastewater Stabilization Ponds
10	Activated Sludge
11	Rotating Biological Contactors
12	Disinfection and Chlorination
13	Alternative Wastewater Treatment, Discharge, and Reuse Methods
14	Laboratory Procedures
15	Management
Appendix: Comprehensive Review Questions, Arithmetic, Words, Index	

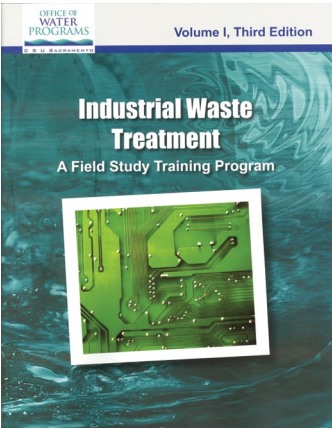
# Industrial Waste Treatment

Vol 1, Third Edition

These courses are designed to train industrial wastewater treatment operators in the safe and effective operation and maintenance of industrial waste treatment facilities, with chapters focusing on preliminary and primary treatment processes.

Manual  
\$49  
  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)

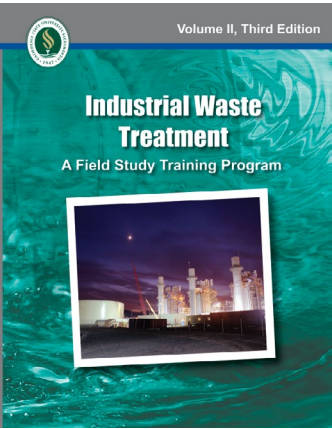


1	The Industrial Plant Operator
2	Industrial Wastewaters
3	Regulatory Requirements
4	Preventing and Minimizing Wastes at the Source
5	Industrial Waste Monitoring
6	Flow Measurement
7	Preliminary Treatment (Equalization, Screening, and pH Adjustment)
8	Physical–Chemical Treatment Processes (Coagulation, Flocculation, and Sedimentation)
9	Filtration
10	Physical Treatment Processes (Air Stripping and Carbon Adsorption)
11	Treatment of Metal Wastestreams
12	Instrumentation
13	Safety
14	Maintenance
Appendix: Comprehensive Review Questions, Words, Index	

# Industrial Waste Treatment

Vol 2, Third Edition

A continuation of Volume 1, Volume 2 focuses on secondary treatment, tertiary treatment, and residual solids management.



1	The Industrial Plant Operator
2	Fixed Growth Processes (Trickling Filters and RBCs)
3	Activated Sludge Process Control
4	Sequencing Batch Reactors
5	Enhanced Biological Control
6	Anaerobic Treatment
7	Residual Solids Management
8	Maintenance
Appendix: Comprehensive Review Questions, Words, Index	

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

Manual  
\$49  
  
Enrollment  
\$75 (9 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)

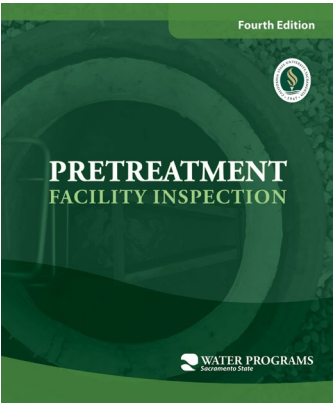
# Pretreatment Facility Inspection

Fourth Edition

This course is designed to train inspectors to use safe and efficient procedures when inspecting industrial pretreatment facilities. Topics include regulations, levels of inspection, measurement methods, and source control. Information about how inspectors can encourage industry professionals to develop waste minimization programs is provided.

Manual  
**\$100 (Includes eText)**  
  
Enrollment  
**\$75 (7.5 CEUs)**

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)

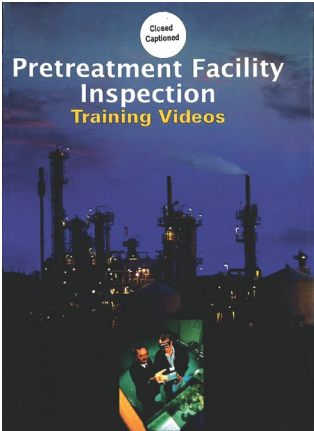


- 1 Introduction to Pretreatment Facility Inspection
  - 2 Safety
  - 3 Wastewater Characterization and Flow Monitoring
  - 4 Inspection and Sampling
  - 5 Pretreatment Program Management
- Answer Key, Glossary, Index

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

# Pretreatment Facility Inspection Training Videos

The 5-topic DVD provides an introduction to the knowledge, skills, and abilities needed by pretreatment facility inspectors. The 30-minute videos include real-world experiences and feature inspectors of industrial pretreatment facilities performing their duties. Current inspectors may learn tips for improving job performance.



DVD  
**\$100**  
  
Enrollment  
**\$75 (0.6 CEUs per course)**

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)

- Meeting the Goal Together**  
Discussing the pretreatment facility, inspection program, inspector and administrator responsibilities, environmental protection, and importance of ethical performance
- Taking a Closer Look**  
Scheduling and conducting inspections, entering an industry for an inspection, level of inspection, after the walk-through, and report writing
- Starting at the Source**  
Inspecting a metal finishing industry, on-site industrial inspections, pollution prevention, and data management
- Taking Up a Collection**  
Reasons and preparation for sampling, collecting, handling, and transporting samples, as well as chain of custody
- Going with the Flow**  
Sampling and flow monitoring, instrumentation, and automatic samplers



## Treatment of Metal Wastestreams

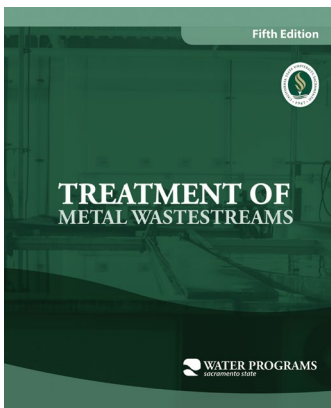
Fifth Edition

This course provides operators of facilities that treat the wastestreams generated from electroplating, metal finishing, and printed circuit board manufacturing with the knowledge and skills needed to operate and maintain those facilities safely and effectively, protecting workers, wastewater collection and treatment operations, the community, and the environment.

Manual  
**\$110 (Includes eText)**

Enrollment  
**\$75 (2.6 CEUs)**

*Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)*



1 Water Quality and Employee Safety

2 Methods of Treatment

3 Operation and Maintenance (O&M)

Answer Key, Glossary, Index

*Instructor guides for wastewater series courses available for \$35 to qualified instructors. Call for ordering information.*

## Struvite Precipitation Potential Calculation Tool

The struvite tool calculates the struvite precipitation potential for a facility based on water quality parameters input by the user. Using data to determine a facility's struvite precipitation potential is important because struvite scale forms in wastewater digestion and post-digestion processes—often fouling equipment and obstructing pipes. Some facilities expend significant maintenance resources to control struvite formation and remove struvite accumulation.

The struvite tool allows the user to vary input parameters to determine what-if scenarios when conditions are changed to control struvite precipitation. This must-have tool for struvite control planning runs in Microsoft Excel® and includes user instructions.





## MANAGEMENT COURSES

# Utility Management

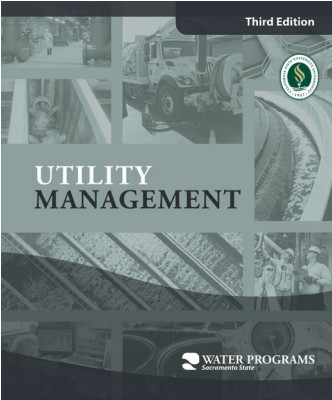
Third Edition

This course is designed to train water or wastewater utility agency managers in the use of good management practices. It focuses on the primary responsibilities of a utility manager and provides practical guidelines for policies and procedures.

Manual  
\$80 (Includes eText)

Enrollment  
\$75 (1.6 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1	Introduction to Utility Management
2	Managing for the Future
Answer Key, Glossary, Index	

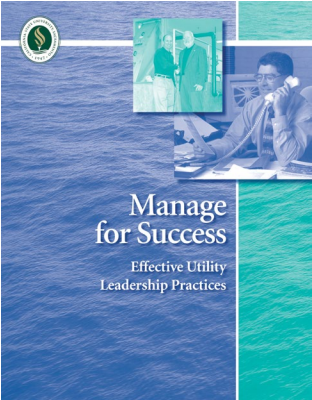
# Manage for Success

Effective Utility Leadership Practices

This course is designed to help utilities provide training to management staff. Topics include problem identification and solutions, working together as a team, communication, and motivation.

Manual  
\$49  
Enrollment  
\$75 (4.5 CEUs)

Prices subject to change without notice.  
Check pricing at [owp.csus.edu](http://owp.csus.edu)



1	Supervising
2	Communicating
3	Human Relations
4	Planning and Organizing
5	Training and Teaching Skills
6	Problem-Solving Skills
7	Decision Making
8	Technical Issues and Regulatory Compliance
9	Financial Management
10	Computers in Managing a Utility
11	Emergency Planning
12	Health and Safety Programs
13	Community Relations
14	Personal and Professional Skills
Appendix: Final Exam, Index	

Select each item to learn more.

Problem	Therefore, the area of the
Step 1	$A = F \times D^2 = 0.3130 \times 12^2 [in^2]$
Step 2	
Step 3	

## MATH APPLICATIONS FOR OPERATORS

# eLearning Math Applications for Operators

Get ready to promote to the next grade or simply improve your math abilities. Our online math courses give you the skills and CEUs you need!

Each course focuses on math concepts related to water treatment plant operation, water distribution system operation, collection systems operation, or wastewater treatment plant operation. Students can practice solving work-related math problems in both US customary and metric units.

Step-by-step instructions show operators how to use math to solve problems typically encountered on the job. Audio notes, figures, and tables are included to expand the learning experience. Each course also offers a review of basic math concepts and operations. The courses do not attempt to cover the topics of any state certification exam.

All course material is offered online, but we recommend purchasing the training manual associated with each course for additional material on situations where operators use math on the job.

To order any of our eLearning math courses, please visit our website at the link below or by scanning the code with your smartphone!

[owp.csus.edu/courses/math-courses.php](http://owp.csus.edu/courses/math-courses.php)



## Math Applications in Water Treatment

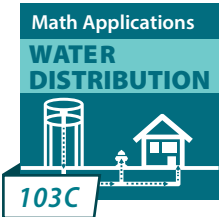
Enrollment—\$250 (2.1 CEUs)



- Topic 1 Basic Concepts
- Topic 2 Reservoir Management
- Topic 3 Coagulation and Flocculation
- Topic 4 Sedimentation
- Topic 5 Filtration
- Topic 6 Disinfection
- Topic 7 Corrosion
- Topic 8 Plant Operation
- Topic 9 Laboratory Procedures

## Math Applications in Water Distribution Systems

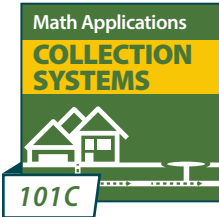
Enrollment—\$250 (1.9 CEUs)



- Topic 1 Basic Calculations in in Water Distribution Systems
- Topic 2 Distribution Facilities
- Topic 3 Distribution Systems Operation and Maintenance
- Topic 4 Disinfection

## Math Applications in Collection Systems

Enrollment—\$250 (1.8 CEUs)



- Topic 1 Design Flow Calculations
- Topic 2 Flow Rate and Velocity Measurement
- Topic 3 Practice Flow/Velocity Calculations Using the Manning Equation
- Topic 4 Inspection and Testing Collection Systems

## Math Applications in Wastewater Treatment

Enrollment—\$250 (3.3 CEUs)



- Topic 1 Basic Calculations in Wastewater Treatment
- Topic 2 Preliminary Treatment
- Topic 3 Primary Treatment
- Topic 4 Activated Sludge System
- Topic 5 Trickling Filter System
- Topic 6 Rotating Biological Contactor
- Topic 7 Wastewater Treatment Ponds (Lagoons)
- Topic 8 Wastewater Disinfection Processes
- Topic 9 Laboratory and Sampling Procedures
- Topic 10 Solids Handling





## **CERTIFICATE** PROGRAMS

## Academic Credit Courses

### Water Treatment and Wastewater Treatment

We offer two certificate programs for academic credit. Both the **Water Treatment Plant Operation Specialist Certificate Program** and the **Wastewater Treatment Plant Operation Specialist Certificate Program** are designed for students seeking academic credit that may be transferred to other colleges and universities.

Registration requires university enrollment in the Sacramento State College of Continuing Education. If you are not planning to transfer your academic units to a college degree program, our other course offerings may better meet your needs.

Students enrolled in a certificate program earn academic credit for each course completed. Upon completion of all three courses in one of the certificate programs, students earn either a Water Treatment Plant Operation Specialist Certificate or a Wastewater Treatment Plant Operation Specialist Certificate, awarded by California State University, Sacramento.

**Each course costs \$912** and includes university enrollment, exam materials, administration and grading of an online final exam, and academic credits. The related training manuals are sold separately.

Contact the Sacramento State College of Continuing Education to register at (916) 278-6984 or [www.cce.csus.edu](http://www.cce.csus.edu).

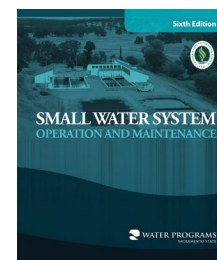
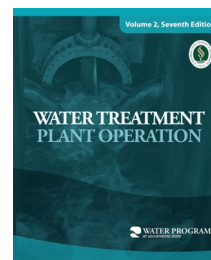
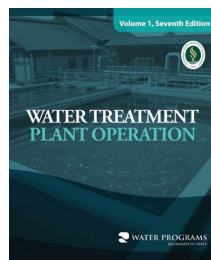
*\*The specialist certificate programs are not available in some states. Please visit the link below for the California State University, Sacramento Office of Academic Affairs web page to see if our program is available in your state.*

[www.csus.edu/academic-affairs/academic-excellence/state-authorization.html](http://www.csus.edu/academic-affairs/academic-excellence/state-authorization.html)



The **Water Treatment Plant Operation Specialist Certificate Program** consists of three courses in the operation and maintenance of water treatment facilities:

- Water Treatment Plant Operation 1 (CE 28A) \$912
- Water Treatment Plant Operation 2 (CE 28B) \$912
- Small Water System Operation and Maintenance (CE 29) \$912



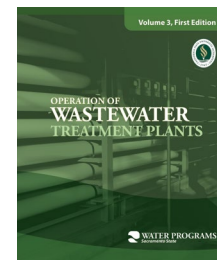
*Related training manuals sold separately (prices subject to change)*

The **Wastewater Treatment Plant Operation Specialist Certificate Program** consists of three courses in the operation and maintenance of wastewater treatment facilities:

- Operation of Wastewater Treatment Plants 1 (CE 38A) \$912
- Operation of Wastewater Treatment Plants 2 (CE 38B) \$912

**COMING SOON!**

- Operation of Wastewater Treatment Plants 3 (CE 39) \$912



*Related training manuals sold separately (prices subject to change)*



**COMING**  
SOON

## Industrial Waste Treatment

Vol 1, Fourth Edition



This material is designed to train industrial wastewater treatment facility operators in the safe and effective operation of treatment processes used to treat industrial wastes for discharge to municipal wastewater conveyance and treatment systems or to receiving waters. Multiple courses using select chapters from the training manual offer students more flexibility to choose their topics of study and meet CEU requirements.

### *Streamlined for faster learning*

- Updated descriptions and graphical representations of preliminary and primary treatment processes commonly used to treat wastewater generated from industrial processes
- Revised and expanded math concepts and example problems used in operations and troubleshooting
- Information on achieving regulatory compliance provided throughout
- Free eText access for 6 months

## Industrial Waste Treatment

Vol 2, Fourth Edition

This material builds on the information in Volume 1 to train industrial treatment facility operators in secondary treatment processes and solids handling, reuse, and disposal. This volume continues to emphasize practices and procedures for safe, effective operation and regulatory compliance. Multiple courses using select chapters from the training manual offer students more flexibility to choose their topics of study and meet CEU requirements.

## Membrane Bioreactors

Second Edition

This completely revised training manual presents information on the safe and effective operation of membrane bioreactors (MBRs). Concepts and strategies for using membranes in wastewater treatment, including instrumentation and control, are covered.





# APPLIED MATH RESOURCES

## US Customary Units

Measure	Name	Abbreviation
Length	foot	ft
Area	foot square	ft <sup>2</sup>
Volume	foot cube	ft <sup>3</sup>
Mass	pound	lb
Time	second	s
Velocity	distance/time	ft/s
Concentration	mass/volume	mg/L
Flow rate	volume/time	ft <sup>3</sup> /s (cfs)
Pressure	weight/area	lb/in <sup>2</sup> (psi)
Density	mass/volume	lb/ft <sup>3</sup>

## Unit Abbreviations

in = inch	min = minute
ft = foot	h = hour
yd = yard	d = day
mi = mile	y = year
ac = acre	Mgal/d = MGD
gal = gallon	gal/min = gpm
Mgal = million gallon	psi = lb/in <sup>2</sup>
lb = pound	hp = horsepower
mol = mole	

## Conversion Factors

Measure	Unit	Equivalent
Length	ft	12 in
	yd	3 ft
	mi	5280 ft
Area	ft <sup>2</sup>	144 in <sup>2</sup>
	ac	43560 ft <sup>2</sup>
Volume	ft <sup>3</sup>	1728 in <sup>3</sup>
	ft <sup>3</sup>	7.48 gal
Mass	lb	16 oz
Time	min	60 s
	h	60 min
	d	24 h
	y	365 d

## Equivalent Units

1 in	2.54 cm	1 ft <sup>3</sup>	28.3 L
1 ft	30.48 cm	1 gal	3.785 L
1 ft <sup>2</sup>	0.0929 m <sup>2</sup>	1 lb	453.6 g
1 ac	0.405 ha	1 oz	28.35 g
1 ft <sup>3</sup>	0.0283 m <sup>3</sup>	1 mi	1.6 km
1 psi	6895.93 Pa	1 atm	14.7 psi



Metric Units

Measure	Name	Abbreviation
Length	meter	m
Area	meter square	m <sup>2</sup>
Volume	meter cube	m <sup>3</sup>
Mass	gram	g
Time	second	s
Velocity	distance/time	m/s
Concentration	mass/volume	mg/L
Flow rate	volume/time	m <sup>3</sup> /s
Pressure	weight/area	Pa (N/m <sup>2</sup> )
Density	mass/volume	kg/m <sup>3</sup>

Unit Abbreviations

cm = centimeter	kg = kilogram
m = meter	mol = mole
km = kilometer	s = second
ha = hectare	min = minute
L = liter	h = hour
mL = milliliter	d = day
mg = milligram	y = year
g = gram	Pa = Pascal (N/m <sup>2</sup> )

Conversion Factors

Measure	Unit	Equivalent
Length	m	100 cm
	cm	10 mm
	km	1000 m
Area	m <sup>2</sup>	10 <sup>4</sup> cm <sup>2</sup>
	ha	104 m <sup>2</sup>
Volume	m <sup>3</sup>	106 cm <sup>3</sup>
	m <sup>3</sup>	1,000 L
Mass	kg	1,000 g
Time	h	60 min
	min	60 s
	d	24 h
	y	365 d

Equivalent Units

1 cm	0.3937 in	1 L	0.0353 ft <sup>3</sup>
1 m	3.281 ft	1 L	0.2642 gal
1 m <sup>2</sup>	10.764 ft <sup>2</sup>	1 kg	2.205 lb
1 ha	2.47 ac	1 g	0.0353 oz
1 m <sup>3</sup>	35.315 ft <sup>3</sup>	1 km	0.6214 mi
1 kPa	0.1450 psi	1 atm	101325 Pa

### Water Properties

Density	62.4 lb/ft <sup>3</sup>
Density	8.34 lb/gal
Density	1 kg/L
Density	1 g/cm <sup>3</sup>
1 ft water	0.433 lb/in <sup>2</sup> (psi)
1 m of water	9.81 kPa (kN/m <sup>2</sup> )

### SI Prefixes

Name	Prefix	Multiplier
giga	G	10 <sup>9</sup> = 1,000,000,000
mega	M	10 <sup>6</sup> = 1,000,000
kilo	k	10 <sup>3</sup> = 1,000
hecto	h	10 <sup>2</sup> = 100
deca	da	10 <sup>1</sup> = 10
deci	d	10 <sup>-1</sup> = 0.1
centi	c	10 <sup>-2</sup> = 0.01
milli	m	10 <sup>-3</sup> = 0.001
micro	μ	10 <sup>-6</sup> = 0.000001
nano	n	10 <sup>-9</sup> = 0.000000001

### Select Greek Characters in Math

Character	Name	Meaning
γ	Gamma	Weight density, $\gamma = \rho \times g$ where g is gravitational acceleration
Δ	Delta	Change (usually accompanied by another variable)
μ	Mu	Micro
π	Pi	Ratio of the circumference of a circle to its diameter
ρ	Rho	Mass density (for water $\rho = 1 \text{ g/cm}^3$ )
Σ	Uppercase sigma	Sum
σ	Lowercase sigma	Standard deviation (refer to math appendix for details)

### Variables [example units]

A = area [ft <sup>2</sup> ]
C = concentration [mg/L]
Q = flow rate [Mgal/d or ML/d]
V = volume [gal, L]
v = velocity [ft/s, m/s]
H = pressure head [ft, m]
m = mass [lb, kg]
p = pressure [lb/in <sup>2</sup> , Pa]
ρ = density [lb/ft <sup>3</sup> , g/cm <sup>3</sup> ]
E = efficiency [%]
N = normality [eq/L]
M = molarity [mol/L]
t = time [s]
T = temperature [°F, °C]
D = diameter [ft, m]
LR = loading rate [gal/ft/d, L/m/d]
HLR = hydraulic loading rate [cm/d]
OLR = organic loading rate [kg/m <sup>2</sup> /d]
Cl <sub>dose</sub> = chlorine dose [mg/L]
Cl <sub>demand</sub> = chlorine demand [mg/L]
Cl <sub>residual</sub> = chlorine residual [mg/L]
Cl <sub>feed</sub> = chlorine feed rate [kg/d]
BOD = biochemical oxygen demand [mg/L]
COD = chemical oxygen demand [mg/L]

# *Water and wastewater sector professionals are always in demand!*

- *Build a stable, well-paying career*
- *Protect public health*
- *Maintain critical infrastructure*
- *Continue learning throughout your career*
- *Advance your skills and pay*
- *Mentor new operators as a senior operator*
- *Teach the public about the water sector*

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