

LEARNING OUTCOMES AND SUCCESSFUL COMPLETION OF WATER COLLEGE COURSES

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I. INTRODUCTION TO WATER TREATMENT COURSE

Purpose: The Introduction to Water Treatment Course is intended to provide students with the knowledge required for initial licensure and entry into the water treatment field as a grade 1 or 2 level water treatment operator.

Successful Completion: Students must accumulate 36 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 3.6 CEU certificate and pass the course. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 36 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

- Working knowledge of water quality characteristics of water sources including: Groundwater sources, Aquifers, Surface Water sources, Reservoir characteristics, Watersheds, Wells, Raw Water and Clear Well Storage.
- Ability to describe the purpose and operational steps of key water treatment processes used to improve water quality including: Coagulation, Flocculation,

Sedimentation, Filtration, Disinfection, Corrosion Control, Taste and Odor Control, Iron and Manganese removal, Fluoridation, and BATs (Best Available Technologies) used for specific water quality challenges.

- Ability to Explain Operation and Maintenance procedures of equipment used in water treatment plants and processes including; Chemical feeders, Pumps and Motors, Blowers and Compressors, Water meters, Pressure gauges, Instrumentation, and Electrical generators
- Working knowledge of laboratory Procedures and sampling strategies required to ensure adequate water quality to ensure public health and for process control including; Sample
- collection procedures, General Lab Practices, Disinfectant Residuals, Alkalinity levels, pH levels, Turbidity levels, Specific Conductance levels, Hardness concentration, Fluoride levels, Color, Taste and Odor, and Microbiological testing results.
- Working knowledge of drinking water regulations and standards required to protect public health and ensure compliance including: Safe Drinking Water Act and amendments, Surface Water Treatment Rule and amendments, Primary Contaminants, Secondary Contaminants, Lead and Copper Rule, Total Coliform Rule, Operator Certification Regulations.
- Demonstrate overall competency in solving water mathematics problems including: unit conversions, pressure, head, volume, area, flow, velocity, detention time, dosage calculations, solution concentration calculations, plant efficiency, and compliance calculations.

II. INTRODUCTION TO WATER DISTRIBUTION COURSE

Purpose: The Introduction to Water Distribution Course is intended to provide students with the knowledge required for initial licensure and entry into the water distribution field as a grade 1 or 2 level water distribution operator.

Successful Completion: Students must accumulate 36 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 3.6 CEU certificate and pass the course. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 36 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

- Explain the purpose of Federal and State Safe Drinking Water Act regulations and identify associated sampling and reporting requirements.
- Identify primary sources of drinking water and describe water quality characteristics associated with groundwater and surface water sources including aquifers and watersheds.
- Describe operation, installation, repair, and maintenance requirements of distribution system components and equipment including pipes, tanks, valves, meters, hydrants, pumps and motors.
- Describe water quality sampling procedures including collection, transportation of samples, chain of custody paperwork, preservation of samples, and reporting.
- Define basic water quality terms relevant to the operation of water distribution systems and explain the significance of key water quality parameters such as pH, alkalinity, disinfection residuals, and microbiological testing results.
- Describe the operation, maintenance, construction, components and sizing of storage facilities.
- Identify types of pumps and motors used in water distribution systems.
- Describe the characteristics of wells including construction characteristics, well components and their purpose, and pumping characteristics of wells.
- Identify safe practices and required personal protective equipment associated with various types of hazards that may be encountered in water distribution systems including chemical, stored energy, atmospheric and excavation hazard safety.
- Demonstrate overall competency in solving water mathematics problems including: unit conversions, pressure, head, volume, area, flow, velocity, detention time, and dosage calculations.

III. CROSS CONNECTION CONTROL SPECIALIST COURSE

Purpose: The Cross Connection Control Specialist Course is intended to provide students with the knowledge required for initial licensure and entry into the water industry as a Cross Connection Control Specialist.

Prerequisite: Successful completion of the Backflow Tester Course or current licensure as a Backflow Tester.

Successful Completion: Students must accumulate 36 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 3.6 CEU certificate and pass the course. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 36 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

1. Complete a cross connection control site survey.
2. Recognize a cross-connection and assign the appropriate cross connection control measures.
3. Understand and describe the hydraulic activity that causes backflow.
4. Set up a cross connection control program for a water purveyor including all six elements.
5. Locate and apply California or Local codes and regulations for cross connection control of alternative waters (recycled, grey, and raw water).
6. Plan and conduct a cross connection site test including
 - Shutdown test
 - Dye test
 - Drain down test
 - TDS test

IV. BACKFLOW TESTER COURSE

Purpose: The Backflow Tester Course is intended to provide students with the knowledge required for initial licensure and entry into the water industry as a Backflow Tester.

Successful Completion: Students must accumulate 40 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 4.0 CEU certificate and pass the course. This course has both a classroom lecture component and a hands-on component in which students learn to use industry equipment to test various kinds of backflow devices. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 40 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

- Understand and describe the hydraulic activity that causes backflow.
- Identify cross connections and apply appropriate backflow measures given level of hazard.
- Identify federal, state, and local regulations and plumbing codes which relate to backflow protection including the Safe Drinking Water Act, California Drinking Water Regulations, and regulations regarding reclaimed and recycled water.
- Successfully conduct testing and troubleshooting of reduced principle backflow prevention assemblies.
- Successfully conduct testing and troubleshooting of pressure vacuum breaker backflow prevention assemblies.
- Successfully conduct testing and troubleshooting of double check valve backflow prevention assemblies.
- Successfully conduct testing and troubleshooting of spill-resistance vacuum breaker backflow prevention assemblies.

V. INTERMEDIATE WATER TREATMENT COURSE

Purpose: The Intermediate Water Treatment Course is intended to provide students with a journeyman level of knowledge necessary to advance in the water treatment field as a grade 3 to 5 level water treatment operator.

Successful Completion: Students must accumulate 36 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 3.6 CEU certificate and pass the course. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 36 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

- Ability to control key water treatment processes in water treatment plants and conduct quality control testing to optimize the following treatment processes: Coagulation, Flocculation, Sedimentation, Filtration, Disinfection, Corrosion Control, Taste and Odor Control, Iron and Manganese removal, Fluoridation, and BATs (Best Available Technologies) used for specific water quality challenges.
- Apply the Surface Water Treatment Rule in the operation of the filtration process as the responsible lead operator to ensure finished water meets requirements in terms of turbidity levels and disinfection CT requirements.
- Ability to adjust, troubleshoot, repair, and operate equipment used in water treatment plants and processes including; Chemical feeders, Pumps and Motors, Blowers and Compressors, Water meters, Pressure gauges, Instrumentation, and Electrical generators
- Employ laboratory procedures and sampling strategies required to maintain compliance with regulations and optimize water treatment plan operations; Sample collection procedures, General Lab Practices, Disinfectant Residuals, Alkalinity levels, pH levels, Turbidity levels, Specific Conductance levels, Hardness concentration, Fluoride levels, Color, Taste and Odor, and Microbiological testing results.
- Ability to interpret, conduct reporting, and comply with drinking water regulations and standards required to protect public health and ensure

compliance including: Safe Drinking Water Act and amendments, Surface Water Treatment Rule and amendments, Primary Contaminants, Secondary Contaminants, Lead and Copper Rule, Total Coliform Rule, Operator Certification Regulations.

- Demonstrate competence in solving water mathematics problems including: unit conversions, pressure, head, volume, area, flow, velocity, detention time, dosage calculations, solution concentration calculations, plant efficiency, fluoride concentrations, pump efficiencies, Langelier index, SCADA 4-20 mA calculations, CT calculations, horsepower and energy usage calculations and required compliance calculations.

VI. INTERMEDIATE WATER DISTRIBUTION COURSE

Purpose: The Intermediate Water Distribution Course is intended to provide students with a journeyman level of knowledge necessary to advance in the water distribution field as a grade 3 to 5 level water treatment operator.

Successful Completion: Students must accumulate 36 hours of active classroom engagement in this instructor-led course and pass the final exam with a score of 70% or greater to earn a 3.6 CEU certificate and pass the course. Non-allowable time such as breaks, lunch and administration tasks do not count toward the 36 hours of time. For more information on successful completion of courses, please review our policies or contact the CA-NV Section, AWWA at (909) 481-7200.

Learning Outcomes: Upon successful completion of this course, participants will be able to:

- Ensure compliance with federal and state regulations and quality control purposes including conducting water quality sampling collection, transportation of samples, chain of custody paperwork, preservation of samples, reporting to regulatory agencies and records.
- Operate, install, repair, and maintain distribution system components and equipment including pipes, tanks, valves, meters, hydrants, pumps, services and motors.
- Implement corrosion control measures including pH adjustment, alkalinity adjustment, adjust chemical feed of corrosion inhibitors and operation of cathodic protection equipment.

- Ability to properly size storage tanks and water mains.
- Implement required safety practices including personal protective equipment associated with various types of hazards that may be encountered in water distribution systems: chemical, stored energy, atmospheric, confined spaces, electrical, traffic and excavation hazard safety.
- Ability to adjust, troubleshoot, repair, and operate equipment and processes including; Chemical feeders, Pumps and Motors, Blowers and Compressors, Water meters, Pressure gauges, Instrumentation, and Electrical generators
- Monitor and adjust the disinfection process and ensure safe use, transportation, and storage of chlorine compounds and other treatment chemicals.
- Use pump curves, flow, power, efficiency, and electrical requirements to ensure the correct application of pumps and motors.
- Use SCADA and telemetry to gather data and control processes in the distribution system.
- Implement water loss prevention strategies including leak detection, water auditing, and pressure control to optimize distribution operations.
- Ability to conduct emergency repairs using appropriate tools and safe procedures.
- Demonstrate competence in solving water mathematics problems including: unit conversions, pressure, head, volume, area, flow, velocity, detention time, dosage calculations, solution concentration calculations, plant efficiency, fluoride concentrations, pump efficiencies, Langelier index, SCADA 4-20 mA calculations, CT calculations, horsepower and energy usage calculations and required compliance calculations.