

2009 - 2010 Edition



Waterways

Catalog of Courses and Classes for Water Treatment Operators, Water Distribution System Operators, and Small Water Systems

OCT Academy has successfully trained and prepared thousands of water industry professionals since 1988.

Call today to discover what we can do for your operators !



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McClellan, CA
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OCT Academy is an accredited avocational school authorized to provide CEU's under the standards set by IACET - International Association for Continuing Education and Training. OCT Academy is fully compliant with California Title 22 and Operator Certification Regulations, Chapter 13.



A Message from OCT Academy

Robert A. Funk, P.E., CET- President
Registered Professional Civil/ Environmental Engineer (Oregon)
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3305

INTRODUCTION

This edition of our **Waterways** catalog introduces OCT Academy's completely revised outline of courses for California water distribution, treatment, and small water system operators (T1 / D1 – T5 / D5 and SWS).

The curriculum within this catalog was reviewed by California DHS Operator Certification Unit personnel in May, 2005 and is in full compliance with the Department's academic requirements under Specialized Training. The Course titles which appear in this catalog are a match to those that appear under OCT's listing on the State's Operator Certification website.

In addition to compliance with California DHS, OCT now offers water and wastewater classes in both northern and southern Nevada several times each year. OCT water classes and courses are recognized for credit with the Nevada Water Certification Manager in Carson City.

OCT Academy currently offers 36, 54, 66 and 72 hour Courses. Additionally, OCT Academy has created an approved Introduction to Basic Small Water Distribution System Operations Course specifically designed for Small Water System operators. Course fees for some participants may be eligible for re-imbursement under the federal / state SWS – Expense Reimbursement Grant program.

As an IACET Authorized Provider, OCT Academy has offered approved courses since July 17, 2001. The school is in full compliance with California Title 22 and Nevada NAC445A Operator Certification regulations. Certificates of Completion are awarded to each operator who has completed all class sessions, and all of the required study material (homework) assigned.

In compliance with IACET standards, OCT maintains class participation records, and daily sign in sheets. Each operator is assigned an individual identification number utilizing his / her birthdate. Transcripts of work completed can be provided upon request. Records are kept for a period of seven (7) years.

For further information and scheduling, please contact the Customer Service for costs and scheduling.



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OCT Course / Program Outline - Small Water Systems

Introduction To Basic Small Water Distribution System Operations

COURSE TITLE: Introduction to Basic Small Water Distribution System Operations

OPERATOR GRADES: Recommended for Grades 1, Grade 2, Entry Level

PRE REQUISITE: High School Diploma or GED

COURSE DESCRIPTION:

This Introduction to Basic Small Water Distribution System Operations is a comprehensive educational program designed for entry level and grade 1 Water Distribution Operators taking their first Water Distribution System Operations Course. It is intended to acquaint the operators of systems which serve a population of less than 3,300 people with a basic knowledge of D-1, small water distribution system operations. Some participants in the course MAY be eligible for reimbursement under the State of California Expense Reimbursement Grant Program. **Course topics will include:** Water sources, quality and sampling, Basic and Grade 1-2 Water Distribution Mathematics, disinfection within the distribution system, pumps and motors, basic hydraulics, an introduction to California Title 22 Water Quality Regulations, distribution system safety, distribution system and storage facilities design/ maintenance and repairs, backflow/ cross connection control, pipes, valves and fittings, instrumentation and control.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Water Distribution operator.
2. Describe the two major sources of raw water.
3. Solve basic dosage, demand and residual, volumes, PSI and industry related mathematical problems. Demonstrate mathematical application of water formulas and conversions.
4. Demonstrate a basic understanding of hydraulics, friction loss, Hazen-Williams C factors, and the relationship between head and pressure.
5. Discuss the microbiological impact of bacteria, viruses and protozoa on drinking water.
6. Describe disinfection practices to provide safe drinking water.
7. Review pipes, valves, fittings and appurtenances in a water system.
8. Gain a basic knowledge of pumps, pumping and motors.
9. Identify storage tanks, reservoirs and hydropneumatic systems.
10. Understand the importance of map reading and record keeping
11. Review worksite safety practices.
12. Comprehend basic water sampling practices for coliforms, chlorine residuals, temperature, pH, VOC's, IOC's, SOC's and turbidity.
13. Appreciate basic instrumentation practice.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture.

A final examination is given at the completion of the course.

COURSE CONTENT:

1. Basic Level and Grade 1 Water Distribution Math
 - a. Review of basic arithmetic problem solving.
 - b. Industry formula and math conversion applications.
2. Water Sources, Quality Parameters and the SDWA.
3. Water Sampling procedures, safety, pH, temperature, Lead-Copper Rule, Coliform testing and the Surface Water Testing Rule.
4. California State Regulations (Title 22).
5. Disinfection Practices.
6. Water Distribution Systems.
 - a. Design/ maintenance and repair.
 - b. Storage, reservoirs and hydropneumatic tanks.
 - c. Water meters, piping and valves.
 - d. Hydraulics, instrumentation and control.
 - e. Backflow/cross connection control.
7. Pumps and motors.





Water Distribution System Operations - Basic Level

COURSE TITLE: Water Distribution System Operations, Basic Level

OPERATOR GRADES: Recommended for Grades 1, Grade 2, Entry Level

PRE REQUISITE: High School Diploma or GED

COURSE DESCRIPTION:

This is a Basic level Water Distribution Supply Principles course of instruction, designed for entry level, grade 1 and grade 2 operators taking their first Water Distribution System Operations Course. It is intended to acquaint the operators of systems which serve a population over 3,300 people with a basic knowledge of water distribution system operations. Course topics will include: Water sources, quality and sampling, Basic and Grade 1-2 Water Distribution Mathematics, disinfection within the distribution system, pumps and motors, basic hydraulics, an introduction to California Title 22 Water Quality Regulations, distribution system safety, distribution system and storage facilities design/ maintenance and repairs, backflow/ cross connection control, pipes, valves and fittings, instrumentation and control.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Water Distribution operator.
2. Describe the two major sources of raw water.
3. Solve basic dosage, demand and residual, volumes, PSI and industry related mathematical problems. Demonstrate mathematical application of water formulas and conversions.
4. Demonstrate a basic understanding of hydraulics, friction loss, Hazen-Williams C factors, and the relationship between head and pressure.
5. Discuss the microbiological impact of bacteria, viruses and protozoa on drinking water.
6. Describe disinfection practices to provide safe drinking water.
7. Review pipes, valves, fittings and appurtenances in a water system.
8. Gain a basic knowledge of pumps, pumping and motors.
9. Identify storage tanks, reservoirs and hydropneumatic systems.
10. Understand the importance of map reading and record keeping.
11. Review worksite safety practices.
12. Comprehend basic water sampling practices for coliforms, chlorine residuals, temperature, pH, VOC's, IOC's, SOC's and turbidity.
13. Appreciate basic instrumentation practice.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture. A final examination is given at the completion of the course.

COURSE CONTENT:

1. Basic Level and Grade 1 Water Distribution Math.
 - a. Review of basic arithmetic problem solving.
 - b. Industry formula and math conversion applications.
2. Water Sources, Quality Parameters and the SDWA.
3. Water Sampling procedures, safety, pH, temperature, Lead-Copper Rule, Coliform testing and the Surface Water Testing Rule.
4. California State Regulations (Title 22).
5. Disinfection Practices.
6. Water Distribution Systems.
 - a. Design/ maintenance and repair.
 - b. Storage Facilities, reservoirs and hydropneumatic tanks.
 - c. Water meters, piping and valves.
 - d. Hydraulics, instrumentation and control.
 - e. Backflow/cross connection control
7. Pumps and motors.



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OCT Course / Program Outline - Water Distribution System Operations

Water Distribution System Operations - Intermediate Level

COURSE TITLE: Water Distribution System Operations, Intermediate

OPERATOR GRADES: Recommended for Grade 2 and Grade 3

PRE REQUISITE: Successful completion of Basic Level Water Distribution System Operations Course

COURSE DESCRIPTION:

This is the second level of Water Distribution System Operations Courses. This Grade 2-3 Intermediate Water Distribution System Operations course of instruction is designed for grade 2 and grade 3 operators preparing for and taking the Grade 2 or Grade 3 State of California Water Distribution Examination. Course topics will include: Grade 2 and Grade 3 Water Distribution Mathematics, disinfection practices within of the distribution system, groundwater and wells, source water, hydraulics, Safe Drinking Water Act and California Title 22 Water Quality Regulations, water quality monitoring, sampling and laboratory analysis, water chemistry, Distribution System operations, design, repair and maintenance, Water Distribution System and storage facility technology including pipes, valves and fittings and appurtenances, Pumps and motors, basic hydraulics, Instrumentation and SCADA Control, Back flow/ cross connection control and Safety.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Grade 2 or Grade 3 Water Distribution operator.
2. Acquire knowledge of ground and surface water sources as raw water.
3. Solve dosage, demand and residual, volumes, pounds and PSI formulas, hydraulics, and velocity applications in industry related mathematical problem
4. Demonstrate an understanding of hydraulics, friction loss, Hazen-Williams C factors, and the relationship between head and pressure.
5. Discuss the microbiological impact on drinking water quality, and disinfection practices including bacteria, viruses and protozoa in drinking water.
6. Understand disinfection practices to provide safe drinking water.
7. Review pipes, valves, fittings and appurtenances in a water system.
8. Gain a basic knowledge of pumps, pumping and motors.
9. Identify storage tanks, reservoirs and hydropneumatic systems.
10. Understand the importance of map reading and record keeping.
11. Review worksite safety practices.
12. Comprehend basic water sampling practices for coliforms, chlorine residuals, temperature, pH, VOC's, IOC's, SOC's and turbidity.
13. Appreciate basic instrumentation practice.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture. A final examination is given at the completion of the course.

COURSE CONTENT:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Grade 2-3 Water Distribution Mathematics. <ol style="list-style-type: none"> a. Review of basic math problem solving. b. Volumes, Dosage, Demand and Residual. c. Hydraulics and velocity formulas. d. Industry math conversions and problem solving. 2. Water Sources, Quality Parameters and the SDWA. <ol style="list-style-type: none"> a. Microbiology and chemistry. 3. Water Sampling procedures, safety, pH, temperature, Lead-Copper Rule, and Coliform testing. | <ol style="list-style-type: none"> 4. California State Regulations (Title 22). 5. Disinfection Practices. 6. Water Distribution Systems. <ol style="list-style-type: none"> a. Design/ maintenance and repair. b. Storage, reservoirs and hydropneumatic tanks. c. Water meters, pipes, valves, and hydraulics. d. Instrumentation, backflow/cross connection control. f. Distribution mains, lines and grids. 7. Pumps and motors. |
|---|---|





Water Distribution System Operations - Advanced Level

COURSE TITLE: Water Distribution System Operations, Advanced

OPERATOR GRADES: Recommended for Grade 3,4 and Grade 5

PRE REQUISITE: Successful completion of Basic and Intermediate Level Water Supply Principles

COURSE DESCRIPTION:

This is the third level of Water Supply Principle Courses. This Grade 3-5 Advanced Water Distribution Supply Principles course of instruction is designed for grade 3,4 and grade 5 operators preparing for and taking the Grade 3,4 or Grade 5 State of California Water Distribution Examination. Course topics will include: Grade 3,4 and Grade 5 Water Distribution Mathematics, disinfection practices within of the distribution system, Water Sources including groundwater and wells, Storage Facilities, Water Sources, Safe Drinking Water Act and California Title 22 Water Quality Regulations, water quality monitoring, system sampling and laboratory analysis, water chemistry, distribution system operations, design, repair and maintenance, Water Distribution System Technology including pipes, valves and fittings and appurtenances, Pumps and motors, Hydraulics, Back flow/ Cross Connection, SCADA Instrumentation and Control and Safety.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Grade 3,4 or Grade 5 Water Distribution operator and manager.
2. Acquire knowledge of ground and surface water sources and operations necessary to process to potable status.
3. Solve dosage, demand and residual, volumes, pounds and PSI formulas, hydraulics, and velocity applications in industry related mathematical problems, Water Billing and Costs, solution and solution percentages, fluoride chemical solutions, SCADA, pumping and velocity. Additionally, demonstrate mathematical applications of water formulas and conversions.
4. Demonstrate an understanding of hydraulic grade line, gradient and headloss, friction loss, Hazen-Williams C factors, and the relationship between head and pressure and maximum suction lift.
5. Discuss the microbiological impact on drinking water quality, and disinfection practices including bacteria, viruses and protozoa, pathogenic and nuisance organisms in drinking water, the halogens and disinfection.
6. Understand disinfection practices including the properties of chlorine and breakpoint chlorination, chloramines, disinfection bi-products including trihalomethanes and alternate disinfectants to provide safe drinking water.
7. Review pipes and piping materials, valves and value design, joints and fittings, appurtenances, trenching, thrust blocks main breaks and reporting precedures in a water system.
8. Gain a knowledge of pumps, pumping and motors including the fundamentals of pump hydraulics, cavitation, net positive suction head and pump curves.
9. Identify storage tanks, storage tank operations, types of reservoirs and hydropneumatic systems and water demand.
10. Demonstrate map reading, record keeping skills, regulations, requirements, and Review worksite safety practices.
12. Comprehend basic water sampling practices for coliforms, chlorine residuals, temperature, pH, VOC's, IOC's, SOC's, turbidity and the current laws on lead-copper, surface water, total coliform and Chemical Regulations.
13. Possess a working knowledge of basic instrumentation technology and practices and SCADA.
14. Understand the legal aspects, & application of California Title 22 Water Quality Laws & Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture.

A final examination is given at the completion of the course.

COURSE CONTENT:

1. Advanced and Grade 3-5 Water Distribution Math.
 - a. Volumes, dosage, demand, residual and formulas.
 - b. Hydraulics and velocity calculations.
 - c. Industry mathematic conversions and applications.
2. Water Sources, Quality Parameters and the SDWA.
 - a. Surface water sources, hydrologic cycle.
 - b. Classifications of water systems.
 - c. Contaminant groups and standards and Disinfection.
3. Water Sampling including procedures, safety, pH, temperature, Lead-Copper Rule, Coliform testing, sampling, transportation, & Surface Water Testing Rule.
4. California State Regulations (Title 22).
5. Water Distribution Systems - Design / O & M.
 - a. Storage, reservoirs and hydropneumatic tanks.
 - b. Water meters, pipe, valves, lines, grids, valves, hydrants.
 - d. Instrumentation, control, backflow/cross connection.
7. Pumps and motors, hydraulics, cavitation .



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OCT Course / Program Outline -Water Distribution System Operations

Water Distribution System Operations - Specialized Management Training Course

COURSE TITLE: Distribution Operations Management

OPERATOR GRADES: Recommended for Water Distribution/Water Treatment Managers Grades 3, 4 and 5

PRE REQUISITE: Successful completion of Basic and Intermediate Level Water Supply Principles Courses

COURSE DESCRIPTION:

This is a Water Supply Principles Specialized Training Courses designed for Grade 3-5 Water Distribution Managers and Supervisors. Course topics will include: Water Sciences, Pumps and Motors, Grades 3-5 Mathematics, Water Distribution Operations and Utility Management.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Water Distribution operator and manager.
2. Demonstrate knowledge of ground and surface water sources as raw water and the operations necessary to processes this water to potable status.
3. Discuss the Science of Drinking Water including:
4. Identify types of pumps, pumping and motors including the fundamentals of pump hydraulics, cavitation, net positive suction head and pump curves.
5. Define and convey the mathematical conversions and formulas utilized in Advanced Water mathematics
6. Display a knowledge of storage tanks and storage tank operations, types and operations of reservoirs and hydropneumatic systems and water demand and instrumentation technology, practices and SCADA and plant operations and maintenance.
7. Articulate the functions of management, motivation and delegation, problem solving and communication skills, planning and organizing, staffing, employment policies, the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act and procedures and worksite safety practices.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture. A final examination is given at the completion of the course.

COURSE CONTENT:

1. Advanced Level Water Distribution Math
 - a. Volumes, dosage, demand, residual.
 - b. Hydraulics, velocity, chemical calculations.
 - c. Industry math conversions and applications.
2. Ground and surface water sources, hydrologic cycle, Quality Parameters and SDWA, classifications of water systems, contaminant groups and standards.
3. Microbiology, disinfection practices, bacteria, & protozoa.
4. Disinfection practices including the properties of chlorine and breakpoint chlorination, chloramines, disinfection bi-products, trihalomethanes and alternate disinfectants.
5. Chemical structures of water, classifications of matter, valances, acids, bases and salts, pH and alkalinity, coagulation, and polymers.
6. Water Distribution Systems Design/ O & M Storage Facilities, reservoirs and hydro-pneumatic tanks, pipe, valves, hydraulics, instrumentation, backflow/cross connection control, transmission, grids, valves, thrust blocks and hydrants.
7. Pumps and motors, cavitation, pump curves.
8. Managerial and supervisory functions, motivating staff, delegating responsibility, communication skills, problems solving and decision making long range planning, personal policies, and government regulations.





OCT Course / Program Outline -Water Distribution System Operations

Water - Wastewater Pump Course / 36 - 42 Hours

COURSE TITLE: Pump Course

OPERATOR GRADES: Recommended for Grades OIT, 1, 2, 3, 4 WW, SWWS, WT, WD

PREREQUISITE: High School Diploma, or GED.

COURSE DESCRIPTION:

This 36 hour program of instruction includes:

1) Pump theory, 2) Pump Repair and Maintenance 3) Hydraulic headloss in pumping systems, and 4) Pump station electrical systems. Pumping volumes, time, GPM, brakehorse power, cost of operation, headloss, calculations are presented, selection of pipe material, and energy losses sustained when water is pumped through valves and fittings is explored. Series and parallel pumping headloss, suction head, suction lift and the effect of atmospheric pressure are taught.

COURSE OBJECTIVES: Upon completion of the course, the student will be able to:

Part 1. – Pump Theory

1. Understand the basic theory and operation of centrifugal pumps and sewage ejectors, identify basic pump configuration, transformation of velocity head to pressure head, and the classification of pumps.
2. Discuss pump terminology and glossary terms.
3. Explore the types of centrifugal pumps, pump configurations of suction head and lift, and the effects of atmospheric pressure and series and parallel pumping installations.
4. Demonstrate a basic understanding of hydraulics, friction loss, and relationship between the system head curve and friction head.
5. Identify pump components and related nomenclature.
6. Build pump curves and complete pump horsepower math problems.
7. Discuss troubleshooting, and solve pump operating problems.

Part 2. – Pump Repair and Maintenance

1. Working with a factory instructor, troubleshoot and repair pumps.
2. Disassemble / assemble a working pump; identifying mechanical seals, packing glands, wear ring sets, bearings, and impellers.
3. Troubleshoot couplings, misalignment, sand cuts, and other damage.
4. The student will be able to identify excessive noise and bearing problems.

Part 3. - Hydraulic headloss in pumping systems

1. Develop an understanding of hydraulics, and friction loss
2. Identify energy, hydraulic lines, and velocity head.
3. Describe the concept and importance of Net Positive Suction Head Available (NPSHA).

Part 4 - Pump station electrical systems.

1. Review the components of electrical control systems; motor control panels, contacts and motor starter controls, three phase power, float switches, fuses, overload protection and varied switches, flow switches, and electro mechanical devices (solenoid switches).
2. Discuss basic electrical diagrams, power system, control systems, and operation descriptions.
3. Learn the fundamentals of small electrical motors; maintenance problems and electrical troubleshooting measures.

METHOD OF INSTRUCTION: Lecture, workbook activities, audiovisual aides. And hands-on work.

METHODS OF EVALUATION: Quizzes and reviews are administrated between chapter subjects. A Multiple Choice examination is administered at the end of each subject for measure, and a final examination is administered at the end of the course.

COURSE CONTENT:

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|---|--|
| 1. Basic pump theory & operation. | 7. Hydraulic Head Loss in pumping systems. |
| 2. Pump terminology and glossary terms. | 8. Net Positive Suction Head. |
| 3. Types of water – wastewater pumps. | 9. Available Net Positive Suction Head. |
| 4. Pump mathematics. | 10. Pump station electrical system. |
| 5. Pump components. | |
| 6. Pump repair & maintenance. | |



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OCT Course / Program Outline - Fundamentals of Drinking Water Treatment

Fundamentals of Drinking Water Treatment - Basic Level

COURSE TITLE: Fundamentals of Drinking Water Treatment, Basic Level

OPERATOR GRADES: Recommended for Grades 1, Grade 2, Entry Level

PRE REQUISITE: High School Diploma or GED

COURSE DESCRIPTION:

This is a Basic level Fundamentals of Drinking Water Treatment course of instruction, designed for entry level, grade 1 and grade 2 treatment operators taking their first Fundamentals of Drinking Water Course. It is intended to acquaint the operator with a basic concept of drinking water treatment. Course topics will include: Basic and Grades 1-2 Water Treatment Mathematics, Water Sources and Sanitary Hazards, Pumps and Motors, Equipment Maintenance, an introduction to California Title 22 Water Quality Regulations, Record Keeping and Reporting, Basic Water Quality, Disinfection, Lab Analysis and Interpretation, Chemistry, Microbiology, Filtration, Coagulation/Flocculation/Sedimentation, Instrumentation, Pretreatment and Watershed Management, Backflow/ Cross Connection Control and Safety.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Water Treatment operator.
2. Describe the two major sources of raw water and the sanitary hazards involved in the pre-treatment and treatment process of raw water.
3. Solve basic dosage, demand and residual, volumes, chemical dosage calculations, solutions and solutions percentages and industry related mathematical problems and demonstrate the mathematical application of water formulas and conversions .
4. Demonstrate a basic understanding of coagulation/flocculation/sedimentation processes.
5. Discuss the microbiological impact of bacteria, viruses and protozoa on drinking water.
6. Describe disinfection practices to provide safe drinking water.
7. Review basic water chemistry including conventional pretreatment and chemical post-treatment processes and controls.
8. Gain a basic knowledge of pumps, pumping and motors.
9. Understand the importance of laboratory analysis and record keeping.
10. Review equipment maintenance and worksite safety practices.
11. Comprehend basic water sampling practices.
12. Appreciate basic instrumentation practice.
13. Apply basic back flow/ cross connection control fundamentals to the water treatment process.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture. A final examination is given at the completion of the course.

COURSE CONTENT:

1. Basic Level and Grade 1 Water Treatment Math.
 - a. Review of basic arithmetic problem solving techniques.
 - b. Volumes, Dosage, Demand and Residual formulas.
 - c. Solutions, solution percentages, and chemical dosage.
 - d. Filtration.
 - e. Industry conversions and problem solving applications.
2. Water Sources, Quality Parameters and the SDWA.
3. Basic water chemistry, disinfection and microbiology.
4. Water Sampling procedures, lab analysis and interpretation.
5. California Regulations (Title 22), record keeping, and reporting.
6. Conventional surface water treatment, coagulation, flocculation, sedimentation, and filtration.
7. Pumps and motors.
8. Back flow/ cross connection, instrumentation, pre-treatment and watershed management, equipment maintenance and safety.





Fundamentals of Drinking Water Treatment - Intermediate Level

COURSE TITLE: Fundamentals of Drinking Water Treatment, Intermediate Level

OPERATOR GRADES: Recommended for Grades 2, Grade 3, Grade 4 Level

PRE REQUISITE: Fundamentals of Drinking Water Treatment Basic Level

COURSE DESCRIPTION:

This is an intermediate level Fundamentals of Drinking Water Treatment course of instruction, designed for grade 2, grade 3 and grade 4 treatment operators taking their second Fundamentals of Drinking Water Course. It is intended to acquaint the operator with a intermediate level concepts of drinking water treatment. Course topics will include: Grades 2-4 Water Treatment Mathematics, Water Sources and Sanitary Hazards, Pumps and Motors, an introduction to California Title 22 Water Quality Regulations, Record Keeping and Reporting, Disinfection, Lab Analysis and Interpretation, Basic Water Quality, Chemistry, Microbiology, Filtration, Coagulation/Flocculation/Sedimentation, Pretreatment and Watershed Management, Instrumentation, Backflow/ Cross Connection Control and Safety.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a Water Treatment operator.
2. Describe the two major sources of raw water and the sanitary hazards involved in the pre-treatment and treatment process of raw water.
3. Solve basic dosage, demand and residual, volumes, chemical dosage calculations, solutions and solutions percentages and industry related mathematical problems and demonstrate the mathematical application of water formulas and conversions.
4. Demonstrate a basic understanding of coagulation/flocculation/sedimentation processes.
5. Discuss the microbiological impact of bacteria, viruses and protozoa on drinking water.
6. Describe disinfection practices to provide safe drinking water.
7. Review basic water chemistry including conventional pretreatment and chemical post-treatment processes and controls.
8. Gain a basic knowledge of pumps, pumping and motors.
9. Understand the importance of laboratory analysis and record keeping.
10. Review equipment maintenance and worksite safety practices.
11. Comprehend basic water sampling practices.
12. Appreciate basic instrumentation practice.
13. Apply basic back flow/ cross connection control fundamentals to the water treatment process.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture.

A final examination is given at the completion of the course.

COURSE CONTENT:

- | | |
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| <ol style="list-style-type: none"> 1. Basic Level and Grade 1 Water Treatment Math. <ol style="list-style-type: none"> a. Review of basic problem solving techniques. b. Volumes, Dosage, Demand and Residual formulas. c. Solutions and solution percentages. d. Filtration. e. Chemical Dosage. f. Industry math conversions and applications. 2. Water Sources, Quality Parameters and the SDWA 3. Basic water chemistry, disinfection and microbiology 4. Water Sampling procedures, lab analysis and interpretation. | <ol style="list-style-type: none"> 5. California Regulations (Title 22), record keeping and reporting. 6. Conventional surface water treatment, flash mixing, coagulation, flocculation, sedimentation, filtration, and chemical post-treatment. 7. Pumps and motors. 8. Back flow/ cross connection, instrumentation, pre-treatment and watershed management, equipment maintenance and safety. |
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Fundamentals of Drinking Water Treatment - Advanced Level

COURSE TITLE: Fundamentals of Drinking Water Treatment, Advanced Level

OPERATOR GRADES: Recommended for Grades 3, Grade 4, Grade 5 Level

PRE REQUISITE: Fundamentals of Drinking Water Treatment Intermediate Level

COURSE DESCRIPTION:

This is an advanced level Fundamentals of Drinking Water Treatment course of instruction, designed for grade 3, grade 4 and grade 5 treatment operators taking their third Fundamentals of Drinking Water Course. It is intended to acquaint the operator with advanced level concepts of drinking water treatment. Course topics will include: Grades 3-5 Water Treatment Mathematics, Water Sources and Sanitary Hazards, Pumps and Motors, The Safe Drinking Water Act and California Title 22 Water Quality Regulations, Record Keeping and Reporting, Water Sciences including Chemistry, Disinfection, Microbiology, Ion Exchange, Water Softening, Fluoridation, Desalination, Iron and Manganese Removal and Demineralization, Filtration: conventional systems, application points, turbidity levels, system diagrams, components and specifications, media, rates, troubleshooting, ion exchange, Coagulation: clarifiers and clarifying, process specifications, chemical oxidants, mixers, pH effects, common coagulants and alkalinity Flocculation: monitoring points, characteristics, floc size, factors affecting flocculation, and colloidal particles, Sedimentation: general zones, detention time, sedimentation time, percent removal vs. overflow rate, types of clarifiers, sludge removal, design criteria, and tube settlers, pretreatment and watershed management, SCADA and Instrumentation, Backflow/ Cross Connection Control and Safety.

COURSE OBJECTIVES: *Upon completion of the course, the student will be able to:*

1. Describe the responsibilities of a grade 3-5 Water Treatment operator.
2. Describe the similarities and differences in ground and surface raw water and the sanitary hazards involved in the pre-treatment and treatment process of raw water.
3. Solve dosage, demand and residual, volumes, chemical dosage calculations, solutions, filtration, hydraulics, pumping, velocity, jar testing, C•T calculations, solutions and solutions percentages and demonstrate the mathematical application of water formulas and conversions.
4. Demonstrate an understanding of the coagulation/flocculation/sedimentation processes.
5. Discuss the microbiological impact of bacteria, viruses and protozoa on drinking water.
6. Describe disinfection practices to provide safe drinking water.
7. Review water chemistry, advanced pretreatment and chemical post-treatment processes and controls.
8. Demonstrate knowledge of pumps, pumping and motors.
9. Prepare laboratory analysis reports, maps and record and reporting documents.
10. Review equipment maintenance, worksite safety practices and emergency response.
11. Demonstrate water sampling practices as related to the SDWA.
12. Apply instrumentation and SCADA data and practices.
13. Relate back flow/ cross connection control fundamentals to the water treatment process.
14. Understand the legal aspects, moral requirements and application of California Title 22 Water Quality Laws and the Safe Drinking Water Act.

METHOD OF INSTRUCTION: Lectures, workbook activities and audiovisual aides.

METHODS OF EVALUATION: A review examination is administered at the conclusion of each lecture.

A final examination is given at the completion of the course.

COURSE CONTENT:

1. Grade 3-5 Water Treatment Mathematics
 - a. Volumes, Dosage, Demand and Residual formulas.
 - b. Hydraulics and Pumping formulas.
 - c. Chemical Dosage and C•T Calculations.
 - d. Industry math conversions and applications
2. Water Sources, Quality Parameters & the SDWA
3. Water Sciences: chemistry, disinfection and microbiology.
4. Water Sampling procedures, lab analysis and interpretation.
5. California Regulations (Title 22), record keeping and reporting.
6. Surface water treatment: water treatment flow charts, flash mixing, coagulation, flocculation, sedimentation, filtration, chemical post-treatment, and treatment process parameters.
7. Pumps and motors.
8. Back flow/ cross connection, instrumentation, pre-treatment, watershed management, plant configurations, O & M and safety.





Water Distribution / Water Treatment Educational Programs

OCT Mission Statement: To provide professional water-wastewater industry education, to assist in grade advancement, and to improved management skills. Through education each operator can meet his/her responsibility to “protect the health and well-being of the community they serve.”

The following courses of study designed by OCT instructors have been reviewed by water operations supervisors, the California Department of Health Services, and the Nevada Water Certification Manager. These courses meet the requirements of job-specific tasks which operators and supervisors face on a day-today basis and meet the overall objectives of California Title 22 and Nevada NAC445A Operator Certification Regulations. These courses provide in-depth learning experience so operators can successfully respond to questions and mathematics problems typically found on state certification examinations at individual grade levels.

- ♦ **Water Certification Courses**
- ♦ **Certification Review Classes**
- ♦ **Small Water Systems Courses and Classes**
- ♦ **Contact hour (CEU) classes**
- ♦ **Laboratory Science classes**
- ♦ **Water System Anti-Terrorism classes**
- ♦ **Water Utilities Management classes**
- ♦ **Backflow / Cross-connection Control classes**



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Water Distribution / Water Treatment - Class Titles and Descriptions

Advanced Laboratory Practice

This class builds on the fundamentals also taught in **Basic Laboratory Practice** (a prerequisite to this class) and further explores more advanced laboratory practices. Heavy emphasis on QA / QC procedures using EPA methodologies for advanced instrumentation is taught. **Basic Water Chemistry** is strongly recommended.

GR. 3-4 WD, WT, LS

Advanced Mathematics for Water Treatment Operators, Grades 3-4

Advanced grade 3-4 Water Treatment Plant Operators will learn to solve practice process problems using the Step-by-step method, algebraic formulas, and unit conversions. Advanced level solutions to volumes, pounds, fluoridation, filtration, hydraulics, Clt and log removal calculations, concentration of liquid solutions, blending, velocity, sludge, and water softening problems will be completed in this two to three day class. Take home review and practice problems are included in the workbook utilized in this two day class.

GR. 3-4 WT

Alkalinity, the Monitoring Tool for Water and Wastewater Process Control

This laboratory sciences class explores alkalinity monitoring as a process control method. Predict operations results by performing simple on-site alkalinity tests for coagulation, corrosion control, pH adjustment and others. Review coagulation chemistry equations relating to iron and aluminum coagulation salts and the formation of flocs.

GR. 1-4 WT, SWS, LS

Backflow/ Cross Connection

Procedures and practices for maintaining and managing a backflow/ cross connection program, which will reduce the risk to public potable water supplies. Learn about backflow and back siphonage, as well as, other related the many causes of cross connection dangers to drinking water systems. Review the types of prevention measures possible and to identify the devices and assemblies recommended to prevent backflow, recommended installation practices and recommended cross connection control programs. Learn the benefits of having solid safety practices, and the health and legal aspects of having an active backflow / cross connection program for your community.

GR. 1-5 WD, SWS

Basic Chemistry for Water Operators

The structure and classification of matter, valences, chemical formulas and equations, solutions, acids, bases and salts, the chemistry of treatment processes and practical dosage problems with math reinforcement problems and quizzes.

GR. 2-4 WT, SWS, LS

Water Distribution (WD); Water Treatment (WT); Small Water Systems (SWS); Laboratory Specialists (LS)





Water Distribution / Water Treatment - Class Titles and Descriptions cont.

Basic Hydraulics for Water / Wastewater Operators

Information on basic water hydraulics, properties of fluids and resulting force from elevation are presented in this class. Pipes and piping and the Hazen-Williams “C” factor theory are integrated into flow testing, thrust block sizing and open channel flow discussion.

GR. 2-5 WD, WT, SWS

Basic Laboratory Practice

This class will provide the students with a comprehensive review of environmental chemistry and microbiology particular to the industry. Lab personnel will learn the methods to perform the following test procedures: chlorine residuals, break-point chlorination, turbidity, temperature, acids vs. bases, chlorides, iron and manganese, dissolved oxygen, fluorides, nitrites & nitrates, coliform and heterotrophic bacteria, and basic laboratory safety measures.

GR. 1-2 WD, WT, SWS, LS,

Basic Mathematics for Water Operators

The basic level mathematics class is designed to acquaint Water Operators with the most commonly used mathematical processes encountered in the water industry. Distance, area, circumference, perimeter, gauge and meter calculations, flow rates, basic volume and PSI formulas practice is included to develop confidence and accuracy in beginning water math skills.

OIT, GR. 1 WD, WT, SWS

Basic Microbiology

The fundamentals of microbiology are the focus of this one day class which covers information basic to the understanding and processing of water from a raw to potable state. Topics that are discussed include: identification of common waterborne pathogenic organisms; bacteria, viruses and protozoa. Water sampling practices, laboratory testing methods, biofilm, and heterotrophic bacteria are studied. Basic disinfection mathematics problems may be introduced in this class.

GR. 1-5 WD, WT, SWS, LS

Chloramination Water Disinfection

Research and case histories indicate that chloramination is superior to free chlorine as a distribution system disinfectant because of its ability to control biofilms. The water produced by these systems is free of trihalomethanes and has no biofilm on pipe and tank surfaces. Consumers avoid being exposed to high THM levels. Chloramines are also a good way to reduce risk of coliforms.

GR. 1-5 WD, WT, SWS, LS

Water Distribution (**WD**); Water Treatment (**WT**); Small Water Systems (**SWS**); Laboratory Specialists (**LS**)



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Coagulation-Flocculation and Alkalinity Factors

The coagulation – flocculation class will address operations issues regarding the removal of solids in a range of NTUs and microbiological contaminates. Learn the chemistry of coagulation and the need for “wetting the chemical” during the flash mix step. Learn the use of coagulant salts, and the possible need for pH / alkalinity adjustment to gain optimum flock development. Review the use of coagulant salts, coagulant aids, polymers (cationic, anionic and non-anionic), chemical feed pump operations with the use of graduated cylinders and ml/min mathematics.

GR. 1-4 WT, SWS

Corrosion Control in Potable Water

What is corrosion? How do you measure it? What are the pros and cons of the various water treatment issues associated with changes in water chemistry to reduce corrosiveness? This class covers pH adjustments, aeration, phosphate, passivating films, and silicate additions.

GR. 2-5 WD, WT, SWS

C•t Calculations

A day long class of instruction in the calculation of Clt which includes identifying Table “E” Clt values, actual system Clt values, calculation of simple and complex contact times, and T-10 values are included in this class. Emphasis on determining 2 and 3 Log disinfection contact time for Giardia, Cryptosporidium and chlorine, U.V. and ozone after deductions for plant credits. Referencing temperature and pH guidelines then calculate the additional contact time by adding more storage from point-of-injection to first service within the water system.

GR. 2-4 WT, SWS

Design and Operation of Small Water Systems

In compliance with the State and Federal Water Quality Laws, this class emphasizes raw and finished water quality with the most effective form of treatment for a wide variety of problem water sources. Operators will review the design and installation of small equipment for the treatment of problem surfaces and groundwater sources. Determining water rates, funding construction costs and determining operating costs are basic to the class curriculum.

GR. 1-3 WD, WT, SWS

Disinfection of Public Water Supplies

The microbiology of common waterborne diseases, E.Coli and fecal coliforms are major indicators of pollution and flag the need for disinfection of our public water supplies. With the mandating of filtration by the SDWA combined with mandatory disinfection, these are the double-barrier efforts necessary to achieving safe drinking water. The study of chlorination theory and chemistry, breakpoint chlorination, dosage/ demand/ residual and dosage levels are valuable at all levels of water knowledge.

GR. 1-5 WD, WT, SWS, LS

Distribution Operators Mathematics Grades 1-2

This class utilizes the Step-by-step method to show work, algebraic formulas, and conversions to find the solutions to volume, pounds, dosage/demand/ residual and PSI problems are learned and reinforced with practical water math application problems. Included in the class workbook are extra math problems with detailed solutions for practice at home.

GR. 1-2 WD, SWS

Water Distribution (WD); Water Treatment (WT); Small Water Systems (SWS); Laboratory Specialists (LS)





Distribution Operators Mathematics Grades 3-4

This class is designed for mid- to advanced-level water distribution operators. All math problems solutions are presented using the Step-by-step method, algebraic formulas, and conversions. Process unit formulas, conversions, complex volumes and blending problems, chemical solution calculation, hydraulics and pressure, velocity and flushing formulas and calculations prepare operators for the complex mathematical calculations that may be encountered in daily operations. The class workbook provides reinforcement with problems and five step format solutions for home study.

GR. 3-5 WD

Drinking Water Filtration

This class for small water system and municipal filtration operators reviews the history of turbidity levels, compliance standards, and turbidity reporting units from JTUs – NTUs. It also addresses raw water bacteria, virus and protozoa levels. The class presents all aspects of single media, dual media, and mixed media filtration. Math problems review GPM filtration unit output, GPM loading rates, GPM backwash rates and volumes, Rate of rise, and temperature considerations. The class addresses operational problems relating to mud-balling, air binding, excessive head loss, filter bed cracks, and channeling. Iron and manganese removal, and slow sand filtration are also presented.

GR. 1-4 WT, SWS

Electrical Fundamentals for Water Operators

Circuitry basics, electromagnetism, inductance and capacitance are included in this study of electricity in water and water operations. The class will also focus upon power and control system components, reading electrical diagrams, electrical measurements and troubleshooting electrical problems.

GR. 2-5 WD, WT, SWS

Fire Hydrants

Proper procedures for inspecting, testing and maintaining fire hydrants are the focus of this class. Types of hydrants and terminology, installation, performing inspections, repairs, flow testing, flushing, disinfecting and repairing the distribution system to insure the safety of your community are the thrust of this class.

OIT, GR. 1-3 WD, SWS

Groundwater Microbes, Treatment and Public Health

This is a comprehensive class that focuses on groundwater microorganisms. These include: identification of well biofilm, E. coli, the three strains of iron bacteria, Hips and helicobacter organisms, nuisance and pathogenic organisms, and the disinfection and treatment techniques available to control a wide range of groundwater viruses and other organisms.

GR. 1-4 LS, WD, WT, SWS

Groundwater and Wells

This class reviews basic geology, hydrogeology, drilling and well rehabilitation techniques, and wellhead protection. Discussion of groundwater exploration; well siting, well drilling technologies and techniques; drilling fluids; subsurface sampling methods and techniques; water well design and construction; aquifer testing and well yield are supported by practice test questions.

GR. 1-4 WD, WT, SWS

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Water Distribution / Water Treatment - Class Titles and Descriptions cont.

Instrumentation and SCADA

Basic instrumentation; measurement devices, pressure, flow and levels are all important in the basic design and operation of a water system. Study these and analytical instruments, controls, SCADA, communications and troubleshooting technologies in this “hands-on”, class.

GR. 1-4 **WD, WT, SWS**

Ion-Exchange Water Softening

Municipal water systems which use “hard” groundwater may be required to blend “soft” water to approximately 60 mg/L of hardness to protect the municipality’s investment in piping, valves, pumps, and appurtenances to extend the service life of the water system. Hard water is an O & M money issue for many groundwater districts. This class reviews the two most common types of municipal water softening; ionic exchange and lime – soda ash softening. The class reviews ion exchange chemistry; carbonate and non-carbonate hardness, the use of “grains” and kilo grains in process math problems, percentage of soft water by-pass, hardness removed, and gallons of soft water per service run. Also presented is regeneration of ion exchange resins with salt, and the need for lime and soda ash chemicals when operating the lime – soda ash process.

GR. 3-4 **WT, SWS**

Laboratory Test Methods

This combination interactive lecture and test methods demonstration class covers the basics in water quality testing for compliance and operational needs, including basic colorimetric, titrimetric, nephelometric, electrometric and turbidimetric testing methods for operators.

GR. 2-4 **WD, WT, SWS, LS**

Maps, Record Keeping and Vulnerability

Comprehensive, sectional, arterial and grid maps are invaluable to maintaining a system that can readily identify important locations for leaks, pressure zones, valves and hydrants. Accurate records that are used for legal compliance as well as the rapid retrieval of data and information serve as the foundation for maintaining a facility that is safe and secure from negative influences. Discover how vulnerable your facility is to vandalism, natural occurrences and the threat of terrorism.

GR. 1-5 **WD, WT, SWS**

Mathematics for Water Treatment Operators, Grade 1-2

This class is an entry and lower grade Water Treatment Plant Operators study of process math with an emphasis on the Step-by-step solution method, process formulas, conversions, pounds problems and volume formulas, dosage/demand/residual, simple solution problems, velocity, filtration, hydraulics and pump problems. Disinfection and sedimentation problems are taught and practiced in this class. The class workbook includes problems with detailed solutions for home review and test preparation.

GR. 1-2 **WT, SWS**

Mechanical Maintenance Technologist

Skills in operation, maintenance and troubleshooting of pumping systems are developed. Positive displacement and centrifugal pumps are covered. Application of basic hydraulic concepts and use of pump curves are stressed. Troubleshooting of pumps and lift pump stations is included. Topics include types of pumps, identification of pump parts, disassembly and assembly of pumps, pumping system measurements and lubrication. O & M of chemical feeders is also presented.

GR. OIT, 1, 2, 3, 4 **WW, SWWS, COL**

Water Distribution (WD); Water Treatment (WT); Small Water Systems (SWS); Laboratory Specialists (LS)





Polymers and Coagulants/ Jar Testing

This class is specifically designed to increase the working knowledge of water and wastewater treatment plant operators. Operators will learn to make up jar testing solutions, experience the result of dosage changes, and learn the advantage / disadvantage of a variety of coagulant salts, coagulant aids, and polymers. Learn how jar testing can aid in proper corrosion control, polymer feed, disinfection, and other applications.

GR. 1-4 WT, SWS

Pumps and Motors

Every component of the water industry is dependent upon pumps and their motors. This class covers types of centrifugal pumps, pump terminology, hydraulic fundamentals, pump components, cavitation, friction energy losses, net positive suction head, pump curves, safety, trouble shooting, and pumps mathematics. Included are practice questions for home study. This topic is of major importance at all grades of our industry.

GR. 1-5 WD, WT, SWS

Pump Motor Control Systems

This class includes a review of the components in Electrical Control Systems, Motor Panels, Contacts and Motor Starter Controls. Review of Basic Electrical Diagrams, Power Systems, Control Systems, and Operator Descriptions. Learn the Fundamentals of Small Electrical Motors and troubleshooting measures.

GR. 1,2, 3, 4, 5 WW, COL, SWS

Pump Repair and Maintenance

You know how it works but what do you do when it isn't working? This class looks at standard pump maintenance, trouble shooting potential problems and basic repair options.

GR. 1-5 WD, WT, SWS

Safe Drinking Water Act, The

The Federal and State Water Quality Regulations: 40 CFR, Section 131, better known as the Safe Drinking Water Act is explored focusing on Primary and Secondary Drinking Water Regulations: IOC's, SOC's and VOC's, community water system monitoring and reporting, public notice, MCL's, MCXLG's and SMCL's, THM's, the Lead-Copper Rule, Coliform Rule and other regulations relevant to clean water are explored in-depth in this class.

GR. 1-5 WD, WT, SWS

Safety

Cave-in protection, the confined space entry rule, fall protection, lock-out/ tag-out safety, handling and storing chemicals, hazardous materials, CPR and basic first aid are all addressed in this one day water industry based training.

All WD, WT, SWS

Sampling in the Water Distribution System

The Safe Drinking Water Act mandated procedures for properly collecting, processing and recording samples within the distribution system for laboratory analysis are explored. Proper sampling containers, how to sample, preservatives, labeling, storage and transport time according to federal regulations as well as sample collections for coliform bacteria, lead-copper, surface water treat rule, IOC's, VOC's and SOC's are highlighted in this important one day class.

GR. 1-4 WD, LS, SWS

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Sedimentation and Clarification

This class reviews the operation of rectangular sedimentation tanks, and circular clarifiers. Learn the operations steps necessary to achieve 95 – 99% removal of bacteria, viruses, protozoa, and solids in raw water. The use of Enhanced Coagulation, pH adjustment and the need to monitor TOC levels is reviewed. The four major parts of sedimentation and clarifier units, the need to monitor flow, settling rates, sludge removal rates, and the problems related to temperature inversion are instructed. Identify process control indicators and the need for SVI measurements. Process control mathematics will review the four hydraulic cross check math formulas; detention time, surface loading rate, weir overflow rates, and solids loading rate. The need to maintain dissolved oxygen (DO) in sedimentation tanks and clarifiers and its important role will be illustrated.

GR. 1-4 WT, SWS

State of California Title 22 Regulations

The “Why’s and How’s” of the State of California Water Code: Title 22. MCLs, record keeping requirements, Distribution and Treatment Plant operational regulations and personnel legislation are discussed in this class. The practical application of these laws as they relate to all areas of the water industry in California is stressed. Knowledge of Title 22 is tested throughout the State of California, DHS water certification examination. This class is offered only in the State of California.

GR. 2-5 WD, WT, SWS

Utility Operations Management

The specifics of operating and maintaining a productive water plant provide the foundation for this advanced utility operations management class. Discussion focuses on the most current and cost effective equipment and technology available in our industry. Also emphasized is aligning work unit goals and operations to facilitate cost effective and time saving use of personnel and equipment.

GR. 3-5 WD, WT

Utility Management

Budgets, capital improvements, meetings, contaminated water, contingency planning, employee complaints, emergency response, financial management, communications, operations and maintenance, policies and procedures, public relations, records, safety, staffing and unions; all of this and it isn’t even lunch time. Consolidation and delegation of responsibilities, time management, legal and personnel issues are among the many topics discussed and shared in this “active participation” class.

GR. 3-5 WD, WT, SWS

Water Distribution Certification Review Grade 1-2

Testing can be an anxious time. This overview class reviews the information that is tested on your State’s Grade 1-2 Water Distribution Certification Examination. The math and technical knowledge discussed in this review class are tied directly to each state’s “Expected Range of Knowledge”.

GR. 1-2 WD, SWS

Water Distribution Certification Review Grades 3-5

A review of the math and technical information that is tested at the Grades 3-5 level for Water Distribution Operators is the focus of this class. Emphasis is on information specified by the “Range of Knowledge Expectations” of your State’s certification examination.

GR. 3-5 WD

Water Distribution (**WD**); Water Treatment (**WT**); Small Water Systems (**SWS**); Laboratory Specialists (**LS**)





Water Distribution Operations and Technology

This general review class provides information regarding the distribution system; water supply sources, water quality parameters, water reservoirs and storage, water meters, system hydraulics, types of piping and its uses, fire hydrants, cross-connection, corrosion, pumps, bacteriological sampling, maps, drawings and records keeping in this overview of Water Distribution Operations and Technology.

GR. 1-4 WD, SWS

Water Distribution System Construction

This class acquaints operators with the basics of water system construction including; pre-planning, blueprint reading, traffic control, trenching, cave-in protection, pipe laying procedures, bedding, backfill and clean-up.

GR. 1-5 WD, SWS

Water Treatment Math Gr. 1-2

Entry and intermediate level WTPO level process math worth with emphasis on; The use of the calculator, summary of process formulas, conversions, volumes, pounds problems, dosage/demand/residual, simple solution problems, filtration, hydraulics, pump problems, velocity, sludge, water softening and chemical symbols and formulas. Assorted problems from past state examinations.

GR. 1-2 WT, SWS

Water Treatment Math Gr. 3

Journeyman and senior level WTPO level process math work; Summary of process unit formulas, conversions; emphasis on advanced problems with solutions within problems; volumes, pounds, fluoridation, complex solution problems, filtration, hydraulics, C•t and log removal calculations, velocity, sludge, water softening and chemical symbols and formulas. Assorted problems from past State examinations.

GR. 1-2 WT, SWS

Water Treatment Operations and Technology

This introductory class provides a basic review of all aspects of conventional surface water treatment. Conventional surface water treatment including process parameters, contaminants and their removal, hydraulic diversion coagulation, flocculation and sedimentation, filtration, chemical post-treatment and design and operation of ground water and surface water treatment systems are studied.

GR. 1-5 WT, SWS

Water Distribution (**WD**); Water Treatment (**WT**); Small Water Systems (**SWS**); Laboratory Specialists (**LS**)



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Water Distribution / Water Treatment - Class Titles and Descriptions cont.

Water Sciences

The sciences of chemistry, microbiology, disinfection and microbes in surface and ground water join together to supply information basic to understanding water from its raw state, treatment, distribution and return to the environment. Topics discussed include the identification of water borne pathogenic organisms, structure of matter, chemical dosage and disinfection contact time. This class is an excellent overview of the integration of the different sciences and water.

GR. 2-4 WD, WT, SWS, LS

Water Sources, Quality Parameters, Sanitary Hazards and the SDWA

This class on ground and surface water is basic to all water employees. From the hydrologic cycle to bacteria, viruses, protozoa and the SDWA regulations that govern drinking water, this all inclusive class is a must for operators studying for certification testing at any level.

GR. 1-4 WD, WT, SWS

Water Distribution (**WD**); Water Treatment (**WT**); Small Water Systems (**SWS**); Laboratory Specialists (**LS**)





Workshops

Certified Pump Technologist (4 Days)

This is a very comprehensive four (4) day class designed to provide an in-depth learning experience for all operators who work with, or maintain, pumps within a treatment plant, distribution system or collection system.

The **first two (2) days** of the program concentrates on foundation theory of operating centrifugal pumps; pump terminology, pump hydraulic fundamentals, correcting cavitation problems, troubleshooting tips. The workbook contains over 250 typical water or wastewater examination multiple choice questions. An answer key is included at the end of each chapter.

The remaining **two (2) days** is a “hands on” program working with a major pump manufacturer of municipal pump products. This portion of the program concentrates on pump problem solving, repair, and maintenance practices. Pumps and pump parts in the classroom are identified, disassembled, and then re-assembled under the direction of a factory instructor. It’s the “**real thing**” and leads to certification as a **Certified Pump Technologist** upon satisfactory conclusion of the program and receiving a passing score of 70% on the final examination.

GR. 1 – 4 WD, SWS

Certified Water Sampling (3 days)

This three day class is ideal for all distribution and small water system personnel charged with the responsibility of collecting water samples in their water system. Heavily impacted by the federal Coliform Rule, California Title 22 outlines in section 64415 that sample collection and field tests shall be performed by a certified operator trained by qualified personnel from a certified lab. Other states have similar training regulations. The **Certified Water Sampler** certificate is earned by attending 36 hours of classes and receiving a passing score of 70% on the final examination.

GR. 1-4 WD, WT, SWS

Water Distribution (WD); Water Treatment (WT); Small Water Systems (SWS); Laboratory Specialists (LS)



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Let us know your In-House Training or Proposal Request Now!

Contact OCT for Classes and Tuition Fee Schedule

Courses are completed in 6 - 8 weeks.

Calendar Schedule and Class Locations:

Please contact our Customer Service Department at any of our published toll free numbers, or refer to our website: www.octinc.com for Course schedule and printable registration forms. Or register online! Click on Calendar and select which location.

We accept:



Policies

IN-HOUSE Educational Programs available for 5 or more wastewater operators.

FEE COVERS: Manual and program materials. Lodging and meals NOT included.

CERTIFICATE AND CEU's: Each attendee who fulfills course requirements will receive a certificate of completion acknowledging continuing education unit-- 0.6 CEU for each day's instruction (8:00 a.m. to 4:00 p.m.).

TAX DEDUCTIBLE EXPENSE: "An income tax deduction may be allowed for educational expenses undertaken to maintain or improve professional skills. This includes registration, travel, meals, lodging..." (See Treasury Regulation 1.162-5 [Coughlin v. Commissioner, 203 F.2d 307].)

A 10% cancellation fee will be charged.

PURCHASE ORDERS: We will accept purchase orders from federal, state, county and city organization to be paid within 30 days of program.

WALK-IN REGISTRATIONS: Accepted as space allows.

PLEASE-- NO AUDIO OR VIDEO RECORDING

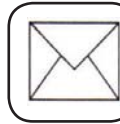
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In-House Training Proposal Request

Please send me information about OCT's training based on the following information:

Today's Date: _____

Type of Program: Workshop
 Certification Review
 CEU Maintenance Contract

Type of Training:

Water Treatment Plant Operator
 Water Distribution
 Wastewater Plant Operator
 Collection Operator
 Supervisor - Management

How many training days anticipated? _____

How many attendees per day? _____

How soon would you want the training?

within 30 days 60 days 90 days

Contact Person _____

Phone Number (____) _____

Fax Number (____) _____

Company Name _____

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Prepay and attend any of OCT Academy's classes within a period of one (1) year from purchase date with an OCT Academy prepaid coupon Book.

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Simply attach one (1) coupon for each class enrollment sent in for any Water or Wastewater class offered by OCT Academy.

The OCT Academy class coupon book offers the advantages of optimum scheduling flexibility while avoiding the restriction of postponing class work for needed contact hours and classroom work during "no / tight budget" periods.

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Firm Name: _____

Firm Mailing Address: _____

City: _____ State: _____ Zip: _____

Contact Phone: (____) _____

Business Ph:/Cell: (____) _____ Business Fax: (____) _____

Email: _____

Please indicate which credit card you are using today: (Circle One)



Master Card



Visa



Visa Corporate Card

Name/Company as it appears on the Credit Card to be charged:

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EXPIRATION DATE

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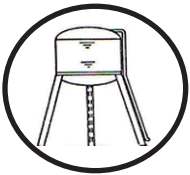


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