

WATR 150: INTRODUCTION TO WATER SYSTEMS

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2023
Credits:	3
Total Contact Hours:	54
Lecture Hours :	54
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	108
Strongly Recommended:	ENGL 101.
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

A basic course in water distribution and treatment covering water quality control practices, water sources, public health aspects of water regulations, supply, water treatment arithmetic, chemical treatment, filtration, corrosion, disinfection, tastes and odors in water, water system operation and maintenance, valves, pipes, pumps, and meters. The material covered in this course will be helpful to those preparing for the California State Water Resources Control Board (SWRCB) D-1 and D-2 Water Distribution Operator's Certificate examinations and the T-1 and T-2 Water Treatment Operator's Certificate examination. 54 lecture hours.

Course Objectives

- Calculate pipe and vessel volumes and hydraulic measurements used in the water supply industry.
- Identify corrosive factors within the water piping systems and recommend corrective action.
- Articulate the disinfection and water testing processes and regulatory controls.
- Discern and apply State and Federal regulations related to the public water supply and treatment industry.
- Describe the use of the various valves and meters used within water distribution systems.
- Explain the basic factors of pump operations necessary in the water industry.
- Describe the methods used for treating domestic water supplies in order to be compliant with current standards in the water treatment industry.

Major Course Content

1. Development of Water Quality Control
 - a. Public water supplies
 - b. Early purification
 - c. Early distribution systems
2. Water Sources
 - a. Hydrologic cycle
 - b. Surface water sources
 - c. Groundwater sources
 - d. Water source selection factors
3. Public Health Aspects of Water Supply
 - a. State and federal regulations
 - b. Fundamental concepts
 - c. Common water-borne disease
 - d. Sources of contamination
 - e. Examples of sanitary defects
4. Water Chemistry
 - a. Hydrogen ion concentration
 - b. Alkalinity
 - c. "Hard" water
5. Water Treatment Arithmetic
 - a. Conversion factors
 - b. Applications
 - c. Problems
6. Chemical Treatment
 - a. Three conditions of solids in liquids
 - b. Coagulation
 - c. Flocculation
 - d. Sedimentation
 - e. Chemical feeders
7. Filtration
 - a. Need for filtration
 - b. Types of filters
 - c. Parts of a rapid sand filter plant
 - d. Operating precautions
8. Softening
 - a. Nature of hardness
 - b. Reason for softening water
 - c. Softening by lime and soda ash
 - d. Softening by base exchange
9. Corrosion
 - a. Corrosion vs. erosion
 - b. Corrosion of metals in water
 - c. Factors influencing corrosion reactions
 - d. Control of corrosion
10. Disinfection
 - a. Purpose of disinfection
 - b. Methods of disinfection of water
 - c. Forms of chlorine
 - d. Nature of elementary chlorine
 - e. Hypochlorinators
 - f. Test for chlorination control
11. Tastes and Odors in Water
 - a. Sources of tastes and odors
 - b. Prevention of tastes and odors
 - c. Removal of tastes and odors
12. Bacterial Tests for Water Quality
 - a. Necessity for tests
 - b. Laboratory tests for disease organisms
 - c. Coliform group of intestinal organisms
 - d. Plate count

- e. Precautions on bacterial testing
 - f. Industry standard for treated water
13. Pump Operation and Maintenance
- a. Mechanics of pumping
 - b. Details of the centrifugal pump
 - c. Pump operation and maintenance
 - d. Pump curve and pump selection
14. Valves
- a. Types of valves
 - b. Flow regulating valves
 - c. Pressure regulating valves
 - d. Backflow prevention valves
 - e. Air and vacuum relief valves
 - f. Valve operation
 - g. Valve maintenance
15. Meters
- a. Need for meters
 - b. Types of meters
 - c. Flow recording devices
 - d. Accuracy of meters
 - e. Maintenance of meters
16. Safety
- a. Trench shoring
 - b. Confined space
 - c. Energy isolation
 - d. Work area traffic safety
17. Public Relations
- a. Community contact
 - b. Public perception
 - c. Emergency notification

Suggested Reading Other Than Required Textbook

American Water Works Association website: awwa.org Environmental Protection Agency website: epa.gov California Department of Public Health website: cdph.ca.gov Employment Development Department website: edd.ca.gov

Examples of Required Writing Assignments

Write a short paper on the administrative and governmental oversight of California's drinking water supply.

Examples of Outside Assignments

Research various Labor Market Information (LMI) sources for the water distribution and treatment industry and submit a summary.

Instruction Type(s)

Lecture, Online Education Lecture