

# WATR-WATER UTILITIES (WATR)

## WATR 120. Introduction to Water Systems 3 Credits (3)

Introduction to and theory of groundwater sources, production, treatment, and distribution.

## WATR 130. Wastewater Collection and Basic Treatment Systems 3 Credits (3)

Introduction to wastewater characteristics, collection, and basic treatment operations.

## WATR 140. Applied Water and Wastewater Math I 3 Credits (3)

Introduction to basic water and wastewater mathematics, flows through distribution networks and collection systems, and fundamentals of flow measurement.

**Prerequisite:** CCDM 114 N or equivalent.

## WATR 160. Systems Maintenance 4 Credits (2+4P)

Basic tools, equipment, maintenance schedules, chlorinator troubleshooting, and chlorine safety. Hands-on training with valves, pumps, meters and chlorination equipment.

## WATR 175. Programmable Logic Controllers 2 Credits (2)

This course will introduce students to electrical safety, theory, and the function, operations, programming and troubleshooting of the PLC controlling common electrical components utilized in control circuits associated with the water and wastewater industry. Restricted to: Community Colleges only.

## WATR 180. Water Chemistry 3 Credits (3)

Basic chemistry with applications to water and wastewater analysis.

**Prerequisite:** CCDM 114 N or consent of instructor.

## WATR 182. Water Chemistry Analysis 1 Credit (3P)

Beginning water and wastewater laboratory analysis including gravimetric, volumetric, and quality control techniques.

**Prerequisite:** CCDM 114 N or equivalent or consent of instructor.

## WATR 190. Water and Wastewater Microbiology 3 Credits (3)

Overview of microorganisms associated with water and wastewater. Growth and reproduction, energy production, and methods of counting.

**Prerequisite:** WATR 130, WATR 180, or consent of instructor.

## WATR 192. Water and Wastewater Microbiological Analysis 1 Credit (3P)

Introduction to water and wastewater treatment operational tests such as BODs, solids testing, activated sludge control tests, use of microscope, and bacteriological techniques.

**Prerequisites:** WATR 130 and WATR 182, or consent of instructor.

## WATR 200. Internship 3-5 Credits

On-the-job training/work experience with municipalities or industries, working in water or wastewater treatment plants, high purity water plants, industrial waste plants, distribution systems, or wastewater collection systems. May be repeated up to 5 credits. Consent of Instructor required.

Restricted to: Water Technology majors. Graded: S/U Grading (S/U, Audit). Restricted to Community Colleges campuses only.

## WATR 220. Water Treatment Systems 3 Credits (3)

Theory of water systems operation including surface water treatment, fluoridation, sodium zeolite softening, corrosion control, iron removal, various filtration methods, and overview of SDWA.

**Prerequisites:** WATR 180 and WATR 182 or consent of instructor.

## WATR 222. Water Systems Operation 1 Credit (3P)

Operations of various water treatment systems including surface water treatment, sodium zeolite softeners, and various filtration methods.

**Prerequisite:** WATR 220 or consent of instructor.

## WATR 230. Advanced Wastewater Treatment 4 Credits (4)

Calculations and operations involved in wastewater and water reclamation plants.

**Prerequisites:** WATR 140, WATR 190, and WATR 192, or consent of instructor.

## WATR 232. Wastewater Systems Operations 1 Credit (3P)

Operation of pretreatment, primary, and biological treatment units.

**Prerequisite:** WATR 230 or consent of instructor.

## WATR 240. Advanced Water and Wastewater Math II 3 Credits (2+2P)

Advanced water and wastewater mathematics. Flow measurement. Systems head and pump curves.

**Prerequisites:** WATR 140.

## WATR 250. Municipal Systems Management 4 Credits (4)

Management of water utility systems including laws, finance, records, and safety.

**Prerequisites:** WATR 120, WATR 130.

## WATR 270. Special Topics 1-4 Credits

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.

## WATR 275. Certification Review 3 Credits (3)

Review of water and wastewater plant operations and laws in preparation for state certification exams. Restricted to Community Colleges campuses only.

**Prerequisite:** WATR 120, WATR 130, WATR 140, WATR 160.

### Learning Outcomes

1. Identify appropriate process changes for different wastewater processes.
2. Identify appropriate process changes for different water processes.
3. Identify corrective actions for equipment failure.
4. Identify analytical data required to complete process control calculations.
5. Accurately complete water process control calculations.
6. Accurately complete wastewater process control calculations.
7. Evaluate operational problems.
8. Identify the sampling points for data collection.

## WATR 285. High Purity Water Treatment Systems 3 Credits (3)

Principles of high purity water production including microfiltration, ultra-filtration, reverse osmosis, and deionization.

**Prerequisite:** WATR 220.

**WATR 287. Advanced Water Chemistry Analysis**

**3 Credits (6P)**

Sampling techniques, analysis, and evaluation of potable water contaminants using gravimetric, volumetric, spectrophotometric, and other instrumentation methods.

**Prerequisite/Corequisite:** WATR 285. Restricted to Community Colleges campuses only.

**Learning Outcomes**

1. Evaluate invalid labs analysis to determine corrective actions.
2. Identify information/data required to complete calculations.
3. Accurately perform calculations.
4. Demonstrate correct/accurate laboratory technique.
5. Demonstrate correct/accurate laboratory technique.
6. Perform operational/laboratory duties safely.

**WATR 290. Advanced Wastewater Microbiology and Chemistry**

**3 Credits (3)**

Covers NPDES permits and DMR calculations and reporting; 503 sludge regs, including pathogen and vector attraction reduction and pollutants; wetlands, composting, and wastewater treatment ponds microbiology; activated sludge bulking and foaming microbiology and treatment; and use of selector to remove nutrients and prevent the growth of filamentous bacteria.

**Prerequisite:** WATR 190, WATR 192.

**WATR 292. Advanced Wastewater Analysis**

**3 Credits (6P)**

Covers sampling techniques, analysis, and evaluation of wastewater contaminants using gravimetric, volumetric, spectrophotometric, and other instrumentation methods.

**Prerequisite:** WATR 190 and WATR 192.