

CENTER FOR WATER STUDIES (CWS)

CWS-100

Career Pathways in Water & Wastewater

3 UNITS

3.0 hours lecture

This course introduces students to Cuyamaca's Center for Water Studies and the career pathways in the water and wastewater field in San Diego County and throughout California. The goal of the course is to develop in each student the skills they need to succeed at Cuyamaca and in their careers in water. This will be the first course in the Center for Water Studies' new Fundamentals of Water module – a series of four introductory courses – and students will be encouraged to begin their studies in water and wastewater with the 100 course. (CSU)

CWS-101

Fundamentals of Water & Wastewater

3 UNITS

3.0 hours lecture

This course provides a broad overview of the water and wastewater fields and issues confronting the industry. Students will learn how source waters are obtained, treated, and distributed and how wastewater is collected, transported, and disposed of in the area. Contemporary issues facing the water and wastewater industry will be explored. (CSU)

CWS-102

Calculations in Water & Wastewater

3 UNITS

Recommended Preparation: Competency in basic math skills

3.0 hours lecture

Study of the mathematical principles and methods involved in solving problems related to water and wastewater treatment, distribution, and collection systems, including volume, flow rate, velocity, pressure, force, unit conversions, dimensional analysis, chemical dose rates, dilutions, filter loading and backwash rates as related to water/wastewater technology. (CSU)

CWS-103

Water Resources Management

3 UNITS

3.0 hours lecture

With the ever increasing demands for safe and reliable supplies of potable water, combined with decreasing supplies and over commitments of our existing water resources, we are facing a serious water crisis in the western United States. This course explores the history and development of California water resources, legal and financial issues, water portfolio diversification, the role of groundwater recharge and management, wastewater reclamation and reuse, desalination, and energy conservation. (CSU)

CWS-105

Water Conservation

3 UNITS

3.0 hours lecture

This course provides theoretical and practical training in applied water use efficiency and a foundation in the need for and major components of comprehensive water conservation programs. Topics include residential, commercial, and landscape customers; water uses; budgets; demand management; water audits; Best Management Practices; rate structures; and program design and management. (CSU)

CWS-106

Electrical & Instrumentation Processes

3 UNITS

3.0 hours lecture

An introductory course in basic electronic, electrical, and control system principles. Electrical safety precautions, component identification, schematic interpretation, motors, transformers, relays and test equipment will be studied. Automated process control devices and an overview of current technologies will be discussed. (CSU)

CWS-107

Safety in Water & Wastewater

3 UNITS

3.0 hours lecture

This course provides a broad overview of Occupational Safety and Health issues in the water and wastewater industry. Students will learn the history of safety related laws and regulations for the Construction and General Industry. Contemporary safety related issues facing the water and wastewater industry will be explored with an emphasis on the Occupational Safety and Health Administration of the California Department of Industrial Relations. (CSU)

CWS-110

Laboratory Analysis for Water & Wastewater

3 UNITS

3.0 hours lecture

Examines basic fundamentals of laboratory analysis with an emphasis on applied chemical and microbiological procedures for water and wastewater plant operators. Includes procedures and techniques used in physical, chemical, bacteriological and biological examination of water/wastewater. Completion of CWS 110 and CWS 210 provides the foundation necessary to obtain a CWEA Grade 1 Laboratory Analyst Certificate. (CSU)

CWS-112

Water Treatment Plant Operations

3 UNITS

Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent

3.0 hours lecture

Study of the sources of water and the public health aspects of water supply; chemical, physical and bacteriological standards of water quality; types of water treatment plants; and water treatment procedures, operation, maintenance, storage and distribution. (CSU)

CWS-114

Wastewater Treatment Plant Operations

3 UNITS

3.0 hours lecture

An introduction to the basic principles involved in the operation of conventional public wastewater treatment plants. Provides information on plant hydraulics, preliminary, primary and secondary treatment processes, disinfection, as well as environmental and safety regulation compliance. (CSU)

CWS-115

Wastewater Reclamation and Reuse

3 UNITS

3.0 hours lecture

This course covers the fundamentals of wastewater reclamation and reuse. Topics include the history of wastewater treatment and reclamation; total resource recovery including bio-solids/biogas harvesting; planning, design, and construction of reclamation plants; and reclaimed wastewater distribution. Problems regarding regulations, marketing, and public perception of using reclaimed wastewater will be discussed, along with public safety issues. (CSU)

CWS-116**Advanced Water Treatment I****3 UNITS**

Prerequisite: Any one of the following will satisfy the prerequisite for CWS 116: 1) Proof of a passing grade for the SWRCB T2 Water Treatment certification exam 2) Possession of a valid SWRCB T2 (or Higher) Water Treatment certification 3) Proof of a passing grade for the SWRCB Grade 2 Wastewater Treatment certification exam 4) Possession of a valid SWRCB Grade 2 (or higher) Wastewater Treatment certification

3.0 hours lecture

This course is a study of the basic principles involved in the theory, components, and operations of an Advanced Water Treatment Facility where reclaimed water is treated to augment potable water supplies and teach recycled water standards. Overview of treatment theory, design, operation, and monitoring, of components that complete an Advanced Water Treatment, multi barrier treatment facility. (CSU)

CWS-130**Water Distribution Systems****3 UNITS**

Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent

3.0 hours lecture

Study of the operation and maintenance of a water supply and distribution system. Water sources, water quality, treatment methods, distribution operations, customer metering, pipeline installation and repair, valves and appurtenances, storage tanks, and maintenance topics will be discussed. Includes mathematical and hydraulic formulas and principles to determine volume, flow, pressure and force. Part of a series required for eligibility to take the California Department of Public Health (CDPH) Water Distribution Operator certification examinations; supports certification examinations for CDPH Water Distribution Operator grade D1 and D2. (CSU)

CWS-132**Wastewater Collection Systems****3 UNITS**

3.0 hours lecture

Study of the components of wastewater collection systems. Overview of design installation, operation, monitoring, maintenance and repair of sewer pipelines, pump stations and related facilities. (CSU)

CWS-134**Pumps, Motors & Valves****3 UNITS**

3.0 hours lecture

Overview of the basic principles of mechanical equipment design, installation, operation, maintenance, repair, overhaul and replacement. Emphasis on understanding the value of preventative maintenance techniques such as equipment monitoring, lubrication analysis, machine alignment and scheduled overhaul. (CSU)

CWS-204**Applied Hydraulics****3 UNITS**

Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent

3.0 hours lecture

Study of the hydraulic principles involved in the operation of water and wastewater distribution and collection systems. The behavior of water in closed-conduit pressure systems and open channel delivery systems, and the types of facilities and infrastructure utilized in water and wastewater service and their operational characteristics will be explored. (CSU)

CWS-206**Advanced Electrical & Instrumentation Processes****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 106 or equivalent

3.0 hours lecture

This course will be an advanced course in instrumentation, controls and SCADA industrial control systems. The focus will be on how these systems are used in the water and wastewater field. This course will cover PLC operations, usage and troubleshooting, how SCADA industrial control systems collect and store data, how the SCADA data historian works and is used by a water and wastewater utility. Finally, the course will look at intelligent equipment, communication standards and the underlying communication network. (CSU)

CWS-207**Practical Skills in Water & Wastewater Systems****2 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 107 or equivalent

1.5 hours lecture, 1.5 hours laboratory

This course provides practical hands-on experience with the equipment and materials commonly used in the water and wastewater industry. Students will become familiar with and learn the specific uses of each piece of equipment commonly utilized in water distribution and wastewater collection systems. Students will have the opportunity to participate in hands-on learning activities and lessons related to the installation and maintenance of equipment and tools used in the water and wastewater industry. This course will utilize the Field Operation Skills Yard (FOSY) to provide a realistic learning environment for the students. (CSU)

CWS-210**Advanced Laboratory Analysis for Water & Wastewater****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 110 or equivalent

3.0 hours lecture

Examines the fundamentals of laboratory analysis with an emphasis on applied chemical and microbiological procedures for water and wastewater plant operators. Includes procedures and techniques used in physical, chemical, bacteriological and biological examination of water/wastewater. Covers State Department of Public Health and Federal EPA, Clean Water and Safe Drinking Water Act regulations related to the operation of a water or wastewater laboratory. Completion of CWS 110 and CWS 210 provides the foundation knowledge and skills necessary to test for the California Water Environment Association (CWEA) Grade 1 Laboratory Analyst Certificate. (CSU)

CWS-212**Advanced Water Treatment Plant Operations****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 112 or equivalent

3.0 hours lecture

The study of water quality control and treatment. Aspects of public health as it relates to the water supply will be highlighted. Sources of contamination and methods of control will be emphasized as well as maintenance of water treatment facilities, safety, cost, and environmental factors. (CSU)

CWS-214**Advanced Wastewater Treatment Plant Operations****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 114 or equivalent

3.0 hours lecture

This course examines how modern wastewater treatment plants are operated to maximize efficiency and reliability in processing municipal wastewater. Emphasis on wastewater treatment plant facilities, equipment, preventative maintenance procedures, plant process monitoring & control, & safety/regulatory compliance. (CSU)

CWS-216**Advanced Water Treatment II****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 116 or equivalent

3.0 hours lecture

This course is an advanced study of the principals involved in the theory, components, and operations of an Advanced Water Treatment Facility where reclaimed water is treated to augment potable water supplies and teach recycled water standards. Overview of treatment theory, design, operation, and monitoring, of components that complete an Advanced Water Treatment, multi barrier treatment facility. (CSU)

CWS-230**Advanced Water Distribution Systems****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 130 or equivalent

3.0 hours lecture

The second of an integrated sequence of courses covering water distribution systems. Students will gain a more comprehensive understanding of the operation and maintenance of a water supply and distribution system including advanced calculations, management, safety, and emergency response issues. Contemporary issues facing the water and wastewater industry will be explored in depth. Expands on topics covered in the introductory course, CWS 130. Part of a series required for eligibility to take the California Department of Public Health (CDPH) Water Distribution Operator certification examinations; prepares students to take and pass CDPH Water Distribution Operator certification examinations for grades D3, D4 and D5. (CSU)

CWS-232**Advanced Wastewater Collection Systems****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 132 or equivalent

3.0 hours lecture

Provides an in-depth understanding of the operation and maintenance of wastewater collection systems. Includes the design, operation, monitoring, maintenance and repair of collection systems and pump stations; equipment maintenance; safety and survival systems; and administration and organizational principles. (CSU)

CWS-268**Membrane Plant Operation****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 112 or 114 or equivalent

3.0 hours lecture

Study of basic membrane technology and the application of this technology to water and wastewater treatment. This course explores the operation and maintenance of membrane components within a water and wastewater treatment system, as well as pre and post treatment considerations. (CSU)

CWS-270**Public Works Supervision****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in CWS 101 or equivalent

3.0 hours lecture

Introduction to the principles and practices of modern supervision and management with an emphasis on contemporary issues facing supervisors and managers in the water utilities industry. (CSU)

CWS-280**Backflow Tester Training****2 UNITS**

1.5 hours lecture, 1.5 hours laboratory

Preparation for the American Water Works Association (AWWA) and the American Backflow Prevention Association (ABPA) certification for Backflow Prevention Assembly Tester Certification. Includes backflow device installation and testing procedures required for the certification testing. (CSU)

CWS-282**Cross-Connection Control Specialist****3 UNITS**

3.0 hours lecture

Study of the administrative and technical procedures required for a cross-connection program, including system inspections, hazard evaluation, identification of cross-connection problems and backflow prevention devices, shut-down tests, and reclaimed water systems. (CSU)

CWS-284**Cross-Connection Control Specialist- Recycled Water****3 UNITS**

3.0 hours lecture

Study of the administrative and technical procedures concerning the production, use and distribution of recycled water including backflow protection, legal, administrative and permitting issues, the treatment process, health and safety aspects, and the cross-connection control (shut down) test as conducted in San Diego County. Various aspects of cross-connection control recycled water shut down testing will be demonstrated. (CSU)

CWS-290**Cooperative Work Experience****1-4 UNITS**

Recommended Preparation: Successful completion of at least three Center for Water Studies courses prior to enrolling in Cooperative Work Experience is highly recommended

Practical application of principles and procedures learned in the classroom to the various phases of water and wastewater treatment, distribution or collection. Work experience will be paid or non-paid at appropriate curriculum-related work sites. Two on-campus sessions will be scheduled. Occupational cooperative work experience credit may accrue at the rate of one to eight units per semester for a total of sixteen units, and students must work 75 paid hours or 60 non-paid hours per unit earned. May be taken for a maximum of 12 units. 75 hours paid or 60 hours non-paid work experience per unit, 1-4 units.