

CENTER FOR WATER STUDIES

100 CAREER PATHWAYS IN WATER & WASTEWATER 3 UNITS

3 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

101 FUNDAMENTALS OF WATER & WASTEWATER 3 UNITS (formerly WWTR 101)

3 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. *Not open to students with credit in WWTR 101.*

CSU

102 CALCULATIONS IN WATER & WASTEWATER 3 UNITS (formerly WWTR 102)

Recommended Preparation: Competency in basic math skills

3 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. *Not open to students with credit in WWTR 102.*

CSU

103 WATER RESOURCES MANAGEMENT 3 UNITS (formerly WWTR 103)

3 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. *Not open to students with credit in WWTR 103.*

CSU

105 WATER CONSERVATION 3 UNITS (formerly WWTR 105)

3 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. *Not open to students with credit in WWTR 105.*

CSU

106 ELECTRICAL & INSTRUMENTATION PROCESSES 3 UNITS (formerly WWTR 106)

3 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. *Not open to students with credit in WWTR 106.*

CSU

107 SAFETY IN WATER & WASTEWATER 3 UNITS
 3 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

110 LABORATORY ANALYSIS FOR WATER & WASTEWATER 3 UNITS
(formerly WWTR 110)
 3 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. *Not open to students with credit in WWTR 110.*
 CSU

112 WATER TREATMENT PLANT OPERATIONS 3 UNITS
(formerly WWTR 112)
 Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent
 3 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. *Not open to students with credit in WWTR 112.*
 CSU

114 WASTEWATER TREATMENT PLANT OPERATIONS 3 UNITS
(formerly WWTR 114)
 3 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. *Not open to students with credit in WWTR 114.*
 CSU

115 WASTEWATER RECLAMATION AND REUSE 3 UNITS
(formerly WWTR 115)
 3 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. *Not open to students with credit in WWTR 115.*
 CSU

130 WATER DISTRIBUTION SYSTEMS 3 UNITS
(formerly WWTR 130)
 Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent
 3 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. *Not open to students with credit in WWTR 130.*
 CSU

132 WASTEWATER COLLECTION SYSTEMS 3 UNITS
(formerly WWTR 132)
 3 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. *Not open to students with credit in WWTR 132.*
 CSU

134 PUMPS, MOTORS & VALVES 3 UNITS
(formerly WWTR 134)
 3 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. *Not open to students with credit in WWTR 134.*
 CSU

204 APPLIED HYDRAULICS 3 UNITS
(formerly WWTR 104)
 Recommended Preparation: "C" grade or higher or "Pass" in CWS 102 or equivalent
 3 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. *Not open to students with credit in WWTR 104.*
 CSU

206 ADVANCED ELECTRICAL & INSTRUMENTATION PROCESSES 3 UNITS
 Prerequisite: "C" grade or higher or "Pass" in CWS 106 or equivalent
 3 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

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

210 ADVANCED LABORATORY ANALYSIS FOR WATER & WASTEWATER 3 UNITS
 Prerequisite: "C" grade or higher or "Pass" in CWS 110 or equivalent course
 3 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

212 ADVANCED WATER TREATMENT PLANT OPERATIONS 3 UNITS
(formerly WWTR 117)
 Prerequisite: "C" grade or higher or "Pass" in CWS 112 or equivalent
 3 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. *Not open to students with credit in WWTR 117.*
 CSU

214 ADVANCED WASTEWATER TREATMENT PLANT OPERATIONS 3 UNITS
(formerly WWTR 120)
 Prerequisite: "C" grade or higher or "Pass" in CWS 114 or equivalent
 3 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, and safety & regulatory compliance. *Not open to students with credit in WWTR 120.*
 CSU

230 ADVANCED WATER DISTRIBUTION SYSTEMS 3 UNITS
(formerly WWTR 265)
 Prerequisite: "C" grade or higher or "Pass" in CWS 130 or equivalent
 3 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, WWTR 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. *Not open to students with credit in WWTR 265.*

CSU

232 ADVANCED WASTEWATER COLLECTION SYSTEMS 3 UNITS

(formerly WWTR 267)

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

3 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. *Not open to students with credit in WWTR 267.*

CSU

268 MEMBRANE PLANT OPERATION 3 UNITS

(formerly WWTR 268)

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

3 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. *Not open to students with credit in WWTR 268.*

CSU

270 PUBLIC WORKS SUPERVISION 3 UNITS

(formerly WWTR 270)

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

3 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. *Not open to students with credit in WWTR 270.*

CSU

280 BACKFLOW TESTER TRAINING 2 UNITS

(formerly WWTR 280)

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. *Not open to students with credit in WWTR 280.*

CSU

282 CROSS-CONNECTION CONTROL SPECIALIST 3 UNITS

(formerly WWTR 282)

3 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.

Not open to students with credit in WWTR 282.

CSU

284 CROSS-CONNECTION CONTROL SPECIALIST-RECYCLED WATER 3 UNITS

(formerly WWTR 284)

3 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. *Not open to students with credit in WWTR 284.*

CSU

290 COOPERATIVE WORK EXPERIENCE 1-4 UNITS

(formerly WWTR 290)

Recommended Preparation: Successful completion of at least three Water/Wastewater technology courses prior to enrolling in Cooperative Work Experience is highly recommended.

75 hours paid or 60 hours non-paid work experience per unit, 1-4 units

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. Not open to students with credit in WWTR 290 without instructor approval.