WWT 110 Waterworks Mathematics (3)
3 hours lecture
Note: *Cross listed as WTE 110; may be taken 4 times*
Provides instruction in entry-level to intermediate-level mathematical calculations used in the operation and evaluation of conventional water/wastewater treatment processes and water distribution systems. The course content has been developed to meet requirements for entry to water/wastewater education program courses. Course will cover basic geometry, metric conversions, flows, pressure, and chemical dosage as it relates to the water/wastewater industry. Material will parallel some of the problems found on State Certification examinations.

WWT 120 Instrumentation and Controls (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 110*
Note: *Cross listed as WTE 120; may be taken 4 times*
Introduction to basic electrical theory, applications, common uses, and real world examples of control systems and instrumentation used in water distribution, water and wastewater treatment plants; including switches, relays, alarms, motors, instrumentation, valve actuators, computers, and communication.

WWT 125 Supervision (3)
3 hours lecture
Note: *Cross listed as WTE 125/PWM 125*
Supervisory aspects of public agencies including organization, decision making, coordination, communication, and public relations. Personnel supervision including coaching, training, evaluation, discipline, team building, morale, and grievances. Safety programs and encouraging safe conditions, actions and attitudes.

WWT 135 Backflow Prevention (3)
2½ hours lecture - 1½ hours laboratory
Note: *Cross listed as WTE 135; may be taken 4 times*
Provides intensive training focused on the field testing procedure for backflow prevention devices and training in the recognition and abatement of cross connections in water and plumbing systems. Students will acquire the knowledge, skills, and abilities required to test as a certified backflow tester.

WWT 138 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: *WTE/WWT 135*
Note: *Cross listed as WTE 138; may be taken 4 times*
The study of the various levels of administrative and technical procedures necessary to operate a cross connection control program. Students will obtain the knowledge to become certified as a "Cross Connection Control Specialist" under the provisions set forth by the American Water Works Association.

WWT 150 Collection Systems Operator (3)
3 hours lecture
Note: *May be taken 4 times*
Wastewater collection systems and collection system equipment, pipeline cleaning and maintenance, system design, safety procedures, inspecting and testing procedures used in collections systems.

WWT 155 Treatment Process Control (3)
3 hours lecture
Recommended preparation: *WWT/WTE 110*
Note: *May be taken 4 times*
A wastewater treatment and disposal course with an emphasis on control of these processes. Topics covered include: the activated sludge secondary treatment process and its variations; sludge digestion, treatment and disposal; safety and housekeeping; maintenance and an overview of effluent disposal, tertiary treatment and reclamation. Emphasis is also given to the role of the operator and provides preparation for solving process control calculations and problems typical of those found in Operator Certification examinations.

WWT 197 Wastewater Technology Education Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Note: *May be taken 4 times*
Topics in Wastewater Technology Education. See Class Schedule for specific topic offered. Course title will designate subject covered.

WWT 215 Motors and Pumps, Operation and Maintenance (3)
3 hours lecture
Recommended preparation: *WTE/WWT 110*
Note: *Cross listed as WTE 215; may be taken 4 times*
Identification of problems encountered, causes of problems, corrective solutions, and repairs in the operation of pumps and motors. Implementation of maintenance programs including scheduling and recordkeeping.

WWT 225 San Diego Regional Internship (4)
12 hours laboratory
Note: *Cross listed as WTE 225; Pass/No Pass grading only; may be taken 4 times*
Provides students with the opportunity to gain work experience in San Diego County water and wastewater agencies through a formal internship. Over the course of 33 weeks, corresponding with fall and spring semesters, the intern will experience four career modules: system operations, system maintenance, water treatment, and wastewater treatment. Students must apply and be accepted by a regional interview committee comprised of representatives from San Diego County water and wastewater agencies and Cuyamaca and Palomar community colleges.

Water Technology Education (WTE)

Contact Occupational & Noncredit Programs for further information.
(760) 744-1150, ext. 2284
Office: AA-136

Associate in Arts Degrees -

AA Degree requirements are listed in Section 6 (green pages).
• Water Technology Education

Certificates of Achievement -

Certificate of Achievement requirements are listed in Section 6 (green pages).
• Water Technology Education

PROGRAM OF STUDY

Water Technology Education

Specifically designed for individuals employed by or seeking employment in water districts in San Diego County.

A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		**Units**
WTE 100	Waterworks Distribution	3
WTE 105	Water Treatment Plant Operation I	3
WTE/WWT 110	Waterworks Mathematics	3
WTE/WWT 120	Instrumentation and Controls	3
WTE/WWT/ PWM 125	Supervision	3
WTE 150	Water Quality Monitoring	3
WTE/WWT 215	Motors/Pumps/Oper/Maintenance	3
Electives (Select 9 units)		
WTE/WWT 135	Backflow Prevention	3
WTE/WWT 138	Cross Connection Specialist	3
WTE 197	Water Technology Education Topics	.5-4
WTE 205	Waterworks Distribution II	3
WTE 210	Water Treatment Plant Operation II	3
WTE/WWT 225	San Diego Regional Internship	4-8
CE 100*	Cooperative Education	3,4
TOTAL UNITS		**30**

* Cooperative Education must be related to this major.

COURSE OFFERINGS

Courses numbered under 100 are not intended for transfer credit.

WTE 100 Waterworks Distribution (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 110*
Note: *May be taken 4 times*
Water utility system operations and maintenance. An introduction to the principles of pressure pipe systems and the hydraulics involved in their operation. Design, installation, operation, and maintenance of basic elements of water systems including pipes, pumps, valves, meters, and related hydraulic units. Operations and maintenance safety considerations emphasized. This course prepares students for the State of California - Water Distribution Operator Grade I, Grade II. and Grade III exams.

WTE 105 Water Treatment Plant Operation I (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 110*
Note: *May be taken 4 times*
Provides an introduction to water treatment plant operations in accordance with the Safe Drinking Water Act (SDWA). Special emphasis is given to implementation of the Surface Water Treatment Rule through USEPA approved filtration technology. Subject matter includes major provisions of the SDWA and its amendments; basic water chemistry; source water assessment; conventional treatment processes; treated water stability; waterborne diseases; public health protection; disinfection; and an introduction to math skills equivalent to those required of State of California Grade II water treatment plant operators. This class is helpful to those preparing for the Grade I and Grade II state examination.

WTE 110 Waterworks Mathematics (3)
3 hours lecture
Note: *Cross listed as WWT 110; may be taken 4 times*
Provides instruction in entry-level to intermediate-level mathematical calculations used in the operation and evaluation of conventional water/wastewater treatment processes and water distribution systems. The course content has been developed to meet requirements for entry to water/wastewater education program courses. Course will cover basic geometry, metric conversions, flows, pressure, and chemical dosage as it relates to the water/wastewater industry. Material will parallel some of the problems found on State Certification examinations.

WTE 120 Instrumentation and Controls (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 110*
Note: *Cross listed as WWT 120; may be taken 4 times*
Introduction to basic electrical theory, applications, common uses, and real world examples of control systems and instrumentation used in water distribution, water and wastewater treatment plants; including switches, relays, alarms, motors, instrumentation, valve actuators, computers, and communication.

WTE 125 Supervision (3)
3 hours lecture
Note: *Cross listed as WWT 125/PWM 125*
Supervisory aspects of public agencies including organization, decision making, coordination, communication, and public relations. Personnel supervision including coaching, training, evaluation, discipline, team building, morale, and grievances. Safety programs and encouraging safe conditions, actions and attitudes.

WTE 135 Backflow Prevention (3)
2½ hours lecture - 1½ hours laboratory
Note: *Cross listed as WWT 135; may be taken 4 times*
Provides intensive training focused on the field testing procedure for backflow prevention devices and training in the recognition and abatement of cross connections in water and plumbing systems. Students will acquire the knowledge, skills, and abilities required to test as a certified backflow tester.

WTE 138 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: *WTE/WWT 135*
Note: *Cross listed as WWT 138; may be taken 4 times*
The study of the various levels of administrative and technical procedures necessary to operate a cross connection control program. Students will obtain the knowledge to become certified as a "Cross Connection Control Specialist" under the provisions set forth by the American Water Works Association.

WTE 150 Water Quality Monitoring (3)
2½ hours lecture - 1½ hours laboratory
Recommended preparation: *WTE /WWT 110*
Note: *May be taken 4 times*
Prepares students to properly monitor public drinking water quality through study of: Federal and State regulations, laboratory analyses, types of contaminants, sample collection techniques and interpretation of monitoring data.

WTE 197 Water Technology Education Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Note: *May be taken 4 times*
Topics in Water Technology Education. See Class Schedule for specific topic offered. Course title will designate subject covered.

WTE 205 Waterworks Distribution II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE 100*
Note: *May be taken 4 times*
Intermediate and advanced instruction in the field of water distribution, types of reservoirs, water lines, pumps, valves, and related appurtenances. Studies design, proper operation, and facilities repair of a public water system. Provides instruction in methods of record keeping and administrative responsibilities related to water systems. This course prepares students for the California Department of Health Services, Water Distribution Operator certification exams at levels D-3, D-4,and D-5 and the "American Water Works Association" certification exams for Grades II, III, and IV.

WTE 210 Water Treatment Plant Operation II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE 105*
Note: *May be taken 4 times*
Advanced water quality control and treatment with emphasis given to state regulations, EPA regulations, advanced mathematics and chemistry. Particular attention will be given to in depth examination of treatment plant processes and the enforcement of the Surface Water Treatment Rule, Total Coliform Rule, Interim Enhanced Surface Water Treatment Rule, Long Term 1 Enhanced Surface Water Treatment Rule, Long Term 2 Enhanced Surface Water Treatment Rule, and Disinfection/Disinfection by Product Rule. This course will be helpful to those preparing for Grade III and IV examinations.

WTE 215 Motors and Pumps, Operation and Maintenance (3)
3 hours lecture
Recommended preparation: *WTE/WWT 110*
Note: *Cross listed as WWT 215; may be taken 4 times*
Identification of problems encountered, causes of problems, corrective solutions, and repairs in the operation of pumps and motors. Implementation of maintenance programs including scheduling and recordkeeping.

WTE 225 San Diego Regional Internship (4)
12 hours laboratory
Note: *Cross listed as WWT 225; Pass/No Pass grading only; may be taken 4 times*
Provides students with the opportunity to gain work experience in San Diego County water and wastewater agencies through a formal internship. Over the course of 33 weeks, corresponding with fall and spring semesters, the intern will experience four career modules: system operations, system maintenance, water treatment, and wastewater treatment. Students must apply and be accepted by a regional interview committee comprised of representatives from San Diego County water and wastewater agencies and Cuyamaca and Palomar community colleges.