Provides instruction in entry level to intermediate level mathematical calculations used in the operation and evaluation of conventional water and wastewater treatment processes. The course content has been developed to meet training requirements for entry to intermediate level certification (Grade I III) for water treatment plant operators. Also, it will cover wastewater collection, treatment and disposal. Material will parallel some of the problems found on State Certification examination.

WWT 120 Instrumentation and Controls (3)
3 hours lecture
Prerequisite: WTE/WWT 110
Note: Cross listed as WTE 120***; m***ay be taken 4 times
Introduction to basic electrical theory. Applications and uses of water and wastewater control systems including switches, relays, alarms, motors, instrumentation and telemetering.

WWT 125 Supervision (3)
3 hours lecture
Note: Cross listed as WTE 125/PWM 125
Managerial aspects of public utilities including organization, decision making, coordination, communication, and public relations. Personnel management including recruiting, training, evaluation, discipline, promotion, 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
Concentrated training in recognition and abatement of cross connections in water supply and plumbing systems. Hands on backflow prevention device testing procedures for certification.

WWT 138 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: WTE/WWT 135
Note: Cross listed as WTE 138
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 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
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, laboratory, or lecture/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; Credit/No Credit grading only; may be taken 2 times
This class will provide students with the opportunity to gain work experience in San Diego County water and wastewater agencies through a formal internship. The one-year internship will provide experience in four primary areas: system operations, system maintenance, wastewater treatment and water treatment. Students must apply to the program and be accepted by a regional interview committee comprised of representatives from San Diego County water and wastewater agencies, Cuyamaca and Palomar Colleges and the San Diego County Water Authority.

Water Technology Education (WTE)

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

Associate in Arts degree requirements, Certificate of Achievement requirements, and Certificate of Proficiency requirements are listed in Section 6 (green pages) of the catalog.

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 50 are non-degree courses.
Courses numbered under 100 are not intended for transfer credit.

WTE 45 Vocational Math Skills for WWT/WTE (3)
3 hours lecture
Note: Cross listed as WWT 45
Introduction to the basic mathematic skills used in water and wastewater calculations. Particular interest is given to industry-relevant problems and examples.

WTE 100 Waterworks Distribution (3)
3 hours lecture
Recommended preparation: WTE/WWT 45
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 "American Water Works Association" Grade I and Grade II exams.

WTE 105 Water Treatment Plant Operation I (3)
3 hours lecture
Recommended preparation: WTE/WWT 45
Note: May be taken 4 times
Practical water quality control and treatment with emphasis given to sources of and quality characteristics of natural water, chemistry, public health protection, sanitary practices, and hydraulic principles. Particular attention will be given to basic water treatment plant process and operation. Will be helpful to those preparing for the Grade I and Grade II examination.

WTE 110 Waterworks Mathematics (3)
3 hours lecture
Recommended preparation: WTE/WWT 45
Note: Cross listed as WWT 110
Provides instruction in entry level to intermediate level mathematical calculations used in the operation and evaluation of conventional water and wastewater treatment processes. The course content has been developed to meet training requirements for entry to intermediate level certification (Grade I - III) for water treatment plant operators. Also, it will cover wastewater collection, treatment and disposal. Material will parallel some of the problems found on State Certification examination.

WTE 120 Instrumentation and Controls (3)
3 hours lecture
Prerequisite: WTE/WWT 110
Note: Cross listed as WWT 120; may be taken 4 times
Introduction to basic electrical theory. Applications and uses of water and wastewater control systems including switches, relays, alarms, motors, instrumentation and telemetering.

WTE 125 Supervision (3)
3 hours lecture
Note: Cross listed as WWT 125/PWM 125
Managerial aspects of public utilities including organization, decision making, coordination, communication, and public relations. Personnel management including recruiting, training, evaluation, discipline, promotion, 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
Concentrated training in recognition and abatement of cross connections in water supply and plumbing systems. Hands on backflow prevention device testing procedures for certification.

WTE 138 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: WTE/WWT 135
Note: Cross listed as WWT 138
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 American Water Works Association.

WTE 150 Water Quality Monitoring (3)
2½ hours lecture-1½ hours laboratory
Recommended preparation: WWT/WTE 110
Regulatory requirements, proper sampling procedures, basic laboratory methods in order to monitor water quality for regulatory compliance or treatment plant operations.

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, laboratory, or lecture/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
Recommended preparation: WTE 100 and WTE 110/WWT 110
Intermediate and advanced instruction in the field of water production, 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: WTE 105 and WTE 110/WWT 110
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; Credit/No Credit grading only; may be taken 2 times
This class will provide students with the opportunity to gain work experience in San Diego County water and wastewater agencies through a formal internship. The one-year internship will provide experience in four primary areas: system operations, system maintenance, wastewater treatment and water treatment. Students must apply to the program and be accepted by a regional interview committee comprised of representatives from San Diego County water and wastewater agencies, Cuyamaca and Palomar Colleges and the San Diego County Water Authority.

Welding (WELD)

Contact the Trade and Industry Department for further information, (760) 744-1150, ext. 2545

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