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
Office: AA-138

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 amenements; basic water chemistry; source water assessment; conventional treatment processes; treated water stability; waterborne diseases; public health protection; 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 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: *WTE /WWT 110*
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, 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.

To satisfy a prerequisite, the student must have earned a letter grade of A, B, C or CR in the prerequisite course, unless otherwise stated.

WTE 205 Waterworks Distribution II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE 100*
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: *A minimum grade of 'C' in WTE 105*
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 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.

Web

See CSIS - Web Technology

Welding (WELD)

Contact the Trade and Industry Department for further information.
(760) 744-1150, ext. 2545
Office: T-1

Associate in Arts Degrees -

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

Certificates of Achievement -

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

Certificates of Proficiency -

Certificate of Proficiency requirements are listed in Section 6 (green pages).
• Entry-Level Gas Metal Arc/Flux Cored Arc Welding
• Entry-Level Gas Tungsten Arc Welding
• Entry-Level Shielded Metal Arc Welding

PROGRAMS OF STUDY

Entry-Level Gas Metal Arc/ Flux Cored Arc Welding

Provides the skills necessary for entry-level employment as a gas metal arc welder/flux cored arc welder.

CERTIFICATE OF PROFICIENCY

Program Requirements		Units
IT/WELD 108	Technical Mathematics	3
WELD 100	Welding I	3
WELD 120	Gas Metal Arc and Flux Cored Arc Welding	3
WELD 135	Print Reading for Welders	3
WELD 160	Metal Layout for Fabrication	3
TOTAL UNITS		**15**

Entry-Level Gas Tungsten Arc Welding

Introdution to GTAW, GMAW, and SMAW welding process with concentration on GTAW. Basic math, print reading, and layout skills and knowllede will be taught to prepare students for entry-level employment as a GTAW welder.

CERTIFICATE OF PROFICIENCY

Program Requirements		Units
IT/WELD 108	Technical Mathematics	3
WELD 100	Welding I	3
WELD 115	Gas Tungsten Arc Welding	3
WELD 135	Print Reading for Welders	3
WELD 160	Metal Layout for Fabrication	3
TOTAL UNITS		**15**

Entry-Level Shielded Metal Arc Welding

Provides the skills necessary for entry-level employment as a shielded metal arc welder.

CERTIFICATE OF PROFICIENCY

Program Requirements		Units
IT/WELD 108	Technical Mathematics	3
WELD 100	Welding I	3
WELD 110	Shielded Metal Arc Welding	3
WELD 135	Print Reading for Welders	3
WELD 160	Metal Layout for Fabrication	3
TOTAL UNITS		**15**

Welding Technology

Provides training for a career in the field of welding. Following the study of basic welding processes, the student may elect to concentrate in one or more of the basic welding processes and to prepare for the industrial certification test.

A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
WELD 100	Welding I	3
WELD 110	Shielded Metal Arc Welding	3
WELD 115	Gas Tungsten Arc Welding	3
WELD 120	Gas Metal Arc and Flux Cored Arc Welding	3
WELD 135	Print Reading for Welders	3
WELD 160	Metal Layout for Fabrication	3
IT/WELD 108	Technical Mathematics	3
CE 100	Cooperative Education	1, 2, 3, 4