PROGRAM OF STUDY

Wastewater Technology Education

Provide comprehensive education to a diverse constituency for a career in the water and wastewater field that prepares students to contribute effectively in a profession responsible for protecting public health.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		**Units**
WWT/WTE 50	Waterworks Mathematics	3
WWT 52	Treatment Plant Operations	3
WWT 54	Collection Systems Operator	3
WWT/WTE 56	Instrumentation and Controls	3
WWT/PWM/ WTE 60	Supervision	3
WWT 64	Treatment Process Control	3
WWT/WTE 66	Motors and Pumps, Operation and Maintenance	3
Electives (Select 6 units)		
WWT/WTE 58	Backflow Prevention	3
WWT/WTE 62	Cross Connection Specialist	3
WWT 97	Wastewater Technology Education Topics	0.5 - 4
* CE 100	Cooperative Education	3 - 4
TOTAL UNITS		**27**

**Cooperative Education must be related to this major.*

COURSE OFFERINGS

Courses numbered under 100 are not intended for transfer credit.

WWT 50 Waterworks Mathematics (3)
3 hours lecture
Note: *Cross listed as WTE 50*
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 52 Treatment Plant Operations (3)
3 hours lecture
An introductory wastewater treatment plant operations course. Topics covered include: the various origins and characteristics of wastewater; an overview of wastewater collections systems; preliminary treatment; primary treatment; fixed film secondary biological treatment processes; treatment ponds and disinfection. Emphasis is given to the role of the operator and preparation for solving practical problems and problems typical of those found in Operator Certification examinations.

WWT 54 Collection Systems Operator (3)
3 hours lecture
Wastewater collection systems and collection system equipment, pipeline cleaning and maintenance, system design, safety procedures, inspecting and testing procedures used in collections systems.

WWT 56 Instrumentation and Controls (3)
3 hours lecture
Note: *Cross listed as WTE 56*
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 58 Backflow Prevention (3)
2½ hours lecture - 1½ hours laboratory
Note: *Cross listed as WTE 58*
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 60 Supervision (3)
3 hours lecture
Note: *Cross listed as PWM/WTE 60*
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 62 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: *WTE/WWT 58*
Note: *Cross listed as WTE 62*
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 64 Treatment Process Control (3)
3 hours lecture
Recommended preparation: *WWT/WTE 50*
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 66 Motors and Pumps, Operation and Maintenance (3)
3 hours lecture
Recommended preparation: *WTE/WWT 50*
Note: *Cross listed as WTE 66*
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 97 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.
Topics in Wastewater Technology Education. See Class Schedule for specific topic offered. Course title will designate subject covered.

Water Technology Education (WTE)

Contact Occupational & Noncredit Programs for further information.
(760) 744-1150, ext. 2284
Office: AA-135

Associate in Science Degrees -

AS 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

Provide comprehensive education to a diverse constituency for a career in the water and wastewater field that prepares students to contribute effectively in a profession responsible for protecting public health.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
WTE/WWT 50	Waterworks Mathematics	3
WTE 52	Waterworks Distribution	3
WTE 54	Water Treatment Plant Operation I	3
WTE/WWT 56	Instrumentation and Controls	3
WTE/ PWM/ WWT 60	Supervision	3
WTE 64	Water Quality Monitoring	3
WTE/WWT 66	Motors and Pumps, Operation and Maintenance	3
Electives (Select 9 units)		
WTE/WWT 58	Backflow Prevention	3
WTE/WWT 62	Cross Connection Specialist	3
WTE 72	Waterworks Distribution II	3
WTE 74	Water Treatment Plant Operation II	3
WTE 97	Water Technology Education Topics	0.5 - 4
* 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 50 Waterworks Mathematics (3)
3 hours lecture
Note: *Cross listed as WWT 50*
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 52 Waterworks Distribution (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 50*
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 54 Water Treatment Plant Operation I (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 50*
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 56 Instrumentation and Controls (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE/WWT 50*
Note: *Cross listed as WWT 56*
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 58 Backflow Prevention (3)
2½ hours lecture - 1½ hours laboratory
Note: *Cross listed as WWT 58*
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 60 Supervision (3)
3 hours lecture
Note: *Cross listed as PWM/WWT 60*
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 62 Cross Connection Specialist (3)
3 hours lecture
Recommended preparation: *WTE/WWT 58*
Note: *Cross listed as WWT 62*
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 64 Water Quality Monitoring (3)
2½ hours lecture - 1½ hours laboratory
Recommended preparation: *WTE /WWT 50*
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 66 Motors and Pumps, Operation and Maintenance (3)
3 hours lecture
Recommended preparation: *WTE/WWT 50*
Note: *Cross listed as WWT 66*
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 72 Waterworks Distribution II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE 52*
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 74 Water Treatment Plant Operation II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in WTE 54*
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 97 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.
Topics in Water Technology Education. See Class Schedule for specific topic offered. Course title will designate subject covered.

Web

See CSIT - Web Technology

Welding (WELD)

Contact the Trade and Industry Department for further information.
(760) 744-1150, ext. 2545
Office: T-102A

Associate in Science Degrees -
AS 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.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
WELD 100	Welding I	3
WELD 105	Metal Cutting, Brazing, Soldering	3
WELD/ IT 108	Technical Mathematics	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 140	Qualification of Welders	3
WELD 145	Pipe Welding	3
WELD 150	Welding Inspection	3
WELD 160	Metal Layout for Fabrication	3
TOTAL UNITS		**33**

COURSE OFFERINGS

WELD 100 Welding I (3)
1½ hours lecture - 4½ hours laboratory
Transfer acceptability: CSU
Introduction to safe practices, setup, and operation of Shielded Metal Arc Welding, Gas Tungsten Arc Welding, Flux Core Arc Welding, and Gas Metal Arc Welding.

WELD 105 Metal Cutting, Brazing, Soldering (3)
1½ hours lecture - 4½ hours laboratory
Transfer acceptability: *CSU*
Cutting metals with oxyfuel, plasma, carbon, and air arc gouging. Joining metals using oxyfuel welding, brazing, and soldering.

WELD 108 Technical Mathematics (3)
3 hours lecture
Note: *Cross listed as IT 108*
Transfer acceptability: *CSU*
Methods and experience in defining and solving mathematical problems in industrial technology. Special emphasis will be given to the application of these basic processes to the solution of the unique mathematical problems encountered in the areas of architecture, automotive, drafting, machine, welding, and woodworking technology.