

Mt. San Jacinto College
Integrated Course Outline of Record

Form B

Submitted by:	Melita Caldwell-Betties	Date:	10/08/2020
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Department	Subject	Course Number	Title
Non-Credit Water Technology	Non-Credit Water Technology NC/WATR	913	Test Preparation for Water Treatment Operations I & II

Units/Hours

Each lecture unit requires 1 hour per week of class time, and 2 hours per week of study outside of class.
Each laboratory unit requires 3 hours per week of class time.
Each activity unit requires 2 hours per week of class time and 1 hour per week of study outside of class.

Total Units

0

Total Contact Hours

8.00 - 8.00

Stand Alone:

Stand Alone

AA/AS Degree General Ed Breadth Area(s):

-none-

General Education Justification:

Maximum Enrollment:

40

Maximum Enrollment Justification:

Justification:

Grading Method:

P/NP Only

TOP code:

0958.00*

Can be Taken

99

time(s) for credit (max 4)

- Visual or Performing Arts course that is required to meet major requirements for UC/CSU
- Intercollegiate athletics course

- Academic/vocational competition course

Catalog Description:

(Please do not refer to transferability or degree, certificate, or employment concentration applicability. Please only describe the course).
(75 words or less in gray box below).

This refresher course covers the expected Range of Knowledge (ROK) required to obtain the California State Water Resources Control Board (SWRCB) Water Treatment Operator License at the T1 and T2 level which serves as the foundation of the (SWRCB) Exam.

Schedule Description:

(Please do not refer to transferability or degree, certificate, or employment concentration applicability. Please only describe the course).
(25 words or less in gray box below).

This course covers the exam preparation knowledge to obtain the industry certification as a Water Treatment Operator at the level T1 and T2 level.

Need for the course:

There is an increasing demand for refresher course offerings in Water Technology (WST). This course is designed to prepare students for entry-level state certification examinations as a Water Treatment Operator at the level T1 and T2 level. This noncredit exam preparation course will also allow students to participate in job-specific technical training.

Prerequisite(s):

Prerequisites go through a separate approval process. See Forms E1-E6 for details.
(For further clarification, contact the Prerequisite Subcommittee)

-none-

Corequisite(s):

Corequisites go through a separate approval process. See Forms E1-E6 for details.

-none-

Recommend Preparation:

Recommended Preparation goes through a separate approval process. See Forms E1-E6 for details.

- WATR 503

Other Enrollment Criteria:

-none-

Learning Objectives:

(please number each objective and express in behavioral terms)
Upon the completion of the course the student will be able to do the following:

1. Examine the specific requirements for passing the State Water Resources Control Board (SWRCB) Water Treatment One (T1) or Treatment Two (T2) Exam and attain certification.
2. Categorize the knowledge, skills, and abilities (KSA™s) related to the duties of a water treatment plant operator, which serves as the foundation of the (SWRCB) Exam.
3. Describe the examination format and scoring rubric of the state certification examination.
4. Review practice test questions including actual questions designed to measure the industry competencies required for certification.
5. Dissect multiple-choice questions of the type that appear on the state certification exam.

- 6. Infer basic waterworks math processes to word problems typically encountered on the SWRCB Water Treatment examinations utilizing the appropriate mathematical formulas to calculate design and operational values.
- 7. Integrate valuable test preparation strategies such as note-taking, time management, reading for comprehension, and identification of math concepts essential to passing the state examination.
- 8. Explain at a level understandable by a non-technical person how to apply process and operational concepts discussed in the course to relevant real-life situations.

Course Content:

(please number the outline of main topics and subtopics)

- 1. Operator certification requirements
- 2. Water treatment mathematics
- 3. Units and conversion factors
- 4. Water measurement (metering)
 - 1. Formulas for area and volume
 - 2. Calculation of dosage, feed rate and flow rates
 - 3. Sources of supply
 - 4. Ground water and surface water
 - 5. Sanitary hazards for each type of water supply
 - 6. Safeguards in well location and construction
 - 7. Chemical, physical and bacteriological characteristics of water
 - 8. Hydrologic cycle
- 5. Disinfection Purpose of disinfection
 - 1. Characteristics of chlorine and chlorine compound
 - 2. Chlorine demand-significance and variability
 - 3. Chlorine storage, feeding and measurements
 - 4. Hazards and safety requirements
- 6. Elementary water chemistry
 - 1. Elements and compounds
 - 2. Alkalinity, hardness, significance of changes in pH and alkalinity
- 7. Water quality parameters
 - 1. Microbiological
 - 2. Organic and inorganic
 - 3. Radiological
- 8. Water quality
 - 1. Drinking water regulations
 - 2. Maximum contaminant levels
 - 3. Elements, compounds, hardness, and pH
 - 4. Significance of organic and inorganic contaminants
 - 5. Lead and copper rule
 - 6. Public notification
 - 7. Disinfection-by-products
- 9. Microbiological and chemical quality
 - 1. Bacteria, viruses and protozoan
 - 2. Coliform group - occurrences, significance
 - 3. Pathogenic diseases
 - 4. Monitoring and reporting requirements
- 10. System operations
 - 1. Distribution pipe system - materials, sanitary hazards including cross-connection
 - 2. Protection, detection, disinfection of new or repaired main, operation and maintenance, sampling
 - 3. Pump and water pressure - pump characteristics, positive displacement pumps, centrifugal pumps, calculation of pump output
 - 4. Chemical feeders
 - 5. Pressure gauges

- 6. Electrical generators
- 11. Water treatment processes
 - 1. Corrosion control
 - 2. Fluoridation
 - 3. Water softening
- 12. Safety OSHA/Cal-OSHA regulations
 - 1. Traffic control
 - 2. Confined spaces

Lab Content:

(please number the outline of main topics and subtopics)

There is no specific lab content for this course.

Methods of Instruction:

Methods of instruction may include, but are not limited to the following:

- **Method:** Activity
Integration: Students will be assigned word problems with increasing levels of difficulty and will utilize algebraic reasoning to demonstrate proficiency in basic waterworks mathematics.
- **Method:** Lecture
Integration: Lecture presentation and discussion with supporting visual materials (overhead slides or multimedia), introducing concepts and terminology relevant to water treatment principles throughout the course (e.g.: sources of water supplies and related water quality issues, types of disinfection and their appropriate applications, water system operation, regulatory impacts and safety issues in the water treatment industry).
- **Method:** Discussion
Integration: Students may participate in individual and/or group activities designed to enhance conceptual understanding or application of information pertinent to water treatment, operations, and maintenance.
- **Method:** Readings
Integration: Students will synthesize water treatment principles from various types of authentic materials, such as textbooks, journals, and manuals identified by the industry as best practice.
- **Method:** Audio-Visual
Integration: The instructor will utilize videos that illustrate various aspects of water treatment. Videos will cover filtration, coagulation, flocculation, sedimentation, disinfection, corrosion control.

Methods of Evaluation:

A student's grade shall be determined by the instructor using multiple measures of performance related to the course objectives. Methods of evaluation may include but are not limited to the following:

- **Method:** Graded assignments/worksheets
Integration: Integration: Student's worksheets will be assessed on the ability to extract relevant mathematical data as well as articulate process, operational, and design parameters. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.
- **Method:** Class Work
Integration: Student's practice worksheets will be assessed on the understanding of applied math concepts covered, such as, coagulation, flocculation, sedimentation filtration, disinfection, and chemical treatment. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.
- **Method:** Quizzes
Integration: Periodic short objective tests of course-related concepts will be used to assess the students' comprehension and retention of water treatment systems operation and basic waterworks mathematics. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.
- **Method:** Exams/Tests
Integration: A combination of objective questions of important concepts will be given to assess the students'

knowledge and comprehension on material covering an operator's job-related knowledge as identified by the California State Water Resources Control Board as essential for minimally competent water industry operators. Topic areas to be examined included such as basic waterworks mathematics, water sources, operational processes, water quality, and chemical conditioning. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.

Examples of Assignments:

Students will be expected to understand and critique college level texts or the equivalent. Reading and writing, as well as out of class assignments are required. These assignments may include but are not limited to the following:

1. In a small group setting of peer students review the handout entitled "Reservoir Management." Become familiar with water quality degradation issues from the recent wildfires and climatic conditions. Be prepared to discuss in class the necessary source water protection methods.
2. Review the assigned mathematical worksheet "Blending and Dilution Calculations." Perform the basic mathematical calculations to determine the required dosage, feed rate, and concentration of alum to be used during the sedimentation process to treat a given flow rate.
3. During the refresher session, the instruction model provides course content in direct alignment with water industry standards and career environments, which makes for a highly relevant and applicable learning experience. To confirm the framework of learning in the course, a practice test (with a variety of sample test questions identifying a set of proficiencies required for entry-level water treatment operations) will be utilized to measure student knowledge as exhibited by scoring at least 70% for all components within a grading rubric.

Textbooks:

- California State University (2018). *Small Water System Operation and Maintenance, Sixth Edition* Office of Water Programs. ISBN: 978-1-323-80066-9
- California State University, Office of Water Programs (2017). *Water Treatment Plant Operation, Volume I, 7th* California State University. ISBN: 978-1-323-78665-9

Other Resources:

Minimum Qualification

- Environmental Technologies