

Mt. San Jacinto College
Integrated Course Outline of Record

Form B

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Date: 10/08/2020

Department	Subject	Course Number	Title
Water Technology	Water Technology WATR	500	Introduction to Water/Wastewater Operations (formerly WATR-100)

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.

Lecture Units	Total Units
1.00	1.00
Lecture Contact Hours	Total Contact Hours
16.00 - 18.00	16.00 - 18.00
Lecture Homework Hours	
32.00 - 36.00	

Stand Alone:

Program Applicable

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

-none-

General Education Justification:

Maximum Enrollment:	40
Maximum Enrollment Justification:	Justification:
Grading Method:	Letter Grade or P/NP
TOP code:	0958.00*

Can be Taken 1 **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 course covers water utility operations plus the basic knowledge needed to advance in the industry. Regulations, industry certification, and the examination process will be discussed as a part of this course.

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).

The course covers water utility operations and provides an overview of career opportunities in the field of water technology.

Need for the course:

This is the first entry into the field of water technology. The goal of the course is to offer students better defined academic opportunities for career selection in the field of water technology. Students will also be instructed as to the level of skills and knowledge necessary to advance in this field. This course is required for an 18 unit certificate and/or AS degree. This course is also an elective in the Environmental Studies: Water and Soil Technologies/Environmental Engineering Emphasis degree.

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.

-none-

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. Differentiate the various sources of water available to water utilities in Southern California and options for access based on water quality, cost, conservation, rights, watershed protection, and regulations.

2. Assess and define the basic unit processes encountered in water technology including: source and raw water capture, residual solids management, disinfection, wastewater reclamation and their applications in a regulatory context.

3. Explore career opportunities in water technology and discover courses necessary to complete a certificate or degree.

4. Investigate water technology program requirements, requisites, advisories, and course scheduling sequences.

5. Compare and contrast the academic and industry certification processes for careers in water technology.
6. Examine current issues in the water technology field and potential impacts: regulatory, financial, and environmental.

Course Content:

(please number the outline of main topics and subtopics)

1. Academic planning

1. Career pathways

2. Academic vs. industry certification

3. Program structure-degree and certificate

4. Course sequencing

5. Requisites and advisories
2. California water history
3. California water geography
4. Hydrologic cycle
5. Water rights
6. Watershed management
7. Flood control policies
8. Water constituents and quality
9. Public Trust Doctrine
10. The water treatment process

1. Source waters

2. Coagulation and flocculation

3. Sedimentation

4. Filtration

5. Water softening

6. Corrosion control

7. Disinfection
11. Water distribution operations

1. Operation and maintenance

2. Storage facilities and transmission systems
12. Collection system operations

1. Operations and maintenance

2. Collections and conveyance systems
13. The wastewater treatment process

1. Wastewater characteristics

2. Preliminary treatment

3. Sedimentation

4. Trickling filters

5. Activated sludge

6. Wastewater treatment ponds

7. Reclaimed/recycle water

8. Residual solids management
14. Water use efficiency

1. Water conservation

2. Water audits

3. Water costs

4. Water regulations
15. Backflow prevention
16. Cross connection controls
17. Current water issues-controversies

Methods of Instruction:

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

- **Method:** Lecture
Integration: Presentation and discussion with supporting visual materials (overheads or multimedia) of the water technology topics will be used as an instructional tool to explain, differentiate water sources, supply, quality, regulations, transmission, distribution, treatment, and protective devices.
- **Method:** Audiovisual
Integration: Videos and/or slides will be used to provide a better understanding of water technology processes or activities. Videos will include aspects of the water infrastructure to include water supply, delivery, collection, treatment, and protection systems.
- **Method:** Guest lecturers
Integration: Guest lecturers will enhance student's comprehension of the subject matter by exposing students to additional course content important to the water technology discipline and consistent with their individual learning needs.
- **Method:** Supplementary material
Integration: Supplemental material will include reviews of current news articles concerning the water industry issues such as new technology, best accepted practices, advances in process control, changes in certification, and operator safety.
- **Method:** Small group discussion
Integration: Small group discussions will be utilized by students to discuss in detail, review, and demonstrate application of content (i.e., through the practice or use of industry terminology) examined in the field of water technology.

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:** Quizzes
Integration: Periodic short objective quizzes of course-related concepts, such as how water or wastewater treatment systems operate, the role of water distribution systems, the value of reclaimed water, and safety considerations. Quizzes will evaluate students' understanding of course material. The final written product will be graded for accuracy, completeness, demonstrated mastery of the subject matter.
- **Method:** Exams/Tests
Integration: A combination of objective questions of important concepts. Exams/tests will evaluate students' retention of specific facts pertaining to water and wastewater processes, such as the water/wastewater treatment process, distribution system and current water issues. The final written product will be graded for accuracy, completeness, demonstrated mastery of the subject matter.
- **Method:** Instructor oral evaluations
Integration: Small group activities (discussion of concepts or regulatory controversies) will be conducted. These activities may be rewarded with points for participation, but not necessarily graded with variable points. Evaluations will evaluate students' understanding of concepts of the water supply infrastructure as related to the hydrological cycle, geographical distribution of water usage, contamination, consumer confidence reporting, and water conservation opportunities. The final product will be graded for demonstrated mastery of the subject matter.
- **Method:** Research Projects
Integration: Students in small groups will conduct research and create a presentation related to concepts and skills developed throughout the course. Students will be evaluated on their research, applications, findings and recommendations on subjects such as bottle water vs. tap water or global water issues. The final written product will be graded for completeness and demonstrated mastery of the subject matter.
- **Method:** Projects
Integration: Students will conduct research related to concepts and skills developed throughout the course. Students will be evaluated on their research, applications, findings and recommendations on issues affecting the management of water resources such as drought and water resources. The final written product will be graded for 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. Read selected chapters in the text and be prepared to take an in-class quiz. Sample Reading: “A water supply system delivers water from its source to the ultimate consumer- homes, businesses, or individual users. The source of a water supply may be either groundwater or surface waters. Surface waters may be natural lakes, streams, rivers, or reservoirs behind dams. Groundwater is a water source below the ground surface.”
2. Sample Assignment: Be prepared to discuss in class, "Where does water come from?"
3. Select a news article relating to water or wastewater. After reading the article, evaluate, and interpret the information given and present it to small discussion group in class.
4. Research the various careers on the internet related to the water and wastewater industry. Write a two-page paper, APA/MLA format.
5. Write a two-three page paper, APA or MLA format, on a specific water challenge facing Californians (i.e. arsenic contamination) using terminology, concepts, and processes learned in the course.
6. Perform an internet search on the educational and experience requirements necessary to receive state certification in water technology.
7. Review the MSJC "Water Technology" catalog pages which details program requirements plus course descriptors and search for courses to create a draft education plan. Instructor-led prompts will be given on course sequencing, advisories, and requisites' completion. The assignment will be reviewed and evaluated by the instructor for completeness.

Textbooks:

- Drinan, Joanne E.; Spellman, Frank R, (2012). *Water and Wastewater Treatment, A Guide for the Non-Engineering Professional* (most current/e). CRC Press, 2nd ed.. ISBN: 978-1439854006
- Wood, Chris (2008). *Dry Spring: The Coming Water Crisis* Raincoast Book Distribution. ISBN: 9781551928142
- Cech, Thomas V. (2010). *Principles of Water Resources: History, Development, Management, and Policy* . 3rd ed. John Wiley and Sons, Inc.. ISBN: 978-0470136317
- Lane, A., Norton M., Ryan, S. (2017). *Water Resources: A New Water Architecture* Wiley-Blackwell. ISBN: 978-1-118-79390-9
- Shammass, Nazih K., Wang, Lawrence K. (2015). *Water Engineering: Hydraulics, Distribution and Treatment* John Wiley and Sons, Inc. ISBN: 978-0-470-39098-6
- Feldman, David L. (2012). *Water* Wiley, John & Son Inc., . ISBN: 978-0-7456-5032-6

Other Resources:

Minimum Qualification

- Environmental Technologies