

Mt. San Jacinto College
Integrated Course Outline of Record

Form B

Submitted by:	Melita Caldwell-Betties	Date:	12/17/2020
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Department	Subject	Course Number	Title
Water Technology	Water Technology WATR	526	Introduction to Wastewater Collections

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
3.00	3.00
Lecture Contact Hours	Total Contact Hours
48.00 - 54.00	48.00 - 54.00
Lecture Homework Hours	
96.00 - 108.00	

Stand Alone:

Program Applicable

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

-none-

General Education Justification:

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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)
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- 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 is designed to train operators in the practical aspects of operating and maintaining wastewater collection systems, emphasizing safe practices and procedures. The course focuses on the knowledge, skills, and abilities required to perform the essential duties of an entry-level wastewater collection system operator. The course also prepares students to take the California Water Environment Association (CWEA) Collection System Certification 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 focuses on the essential duties of wastewater collection systems operations and preparation for entry-level the California Water Environment Association (CWEA) examination.

Need for the course:

Water and sanitation services are recession proof essential public services. There are four major areas in a water program: (1) treatment of raw water, (2) distribution of treated water to customers (3) collection of used water (wastewater) from customers, and (4) treatment of wastewater. Unfortunately, Mount San Jacinto College does not offer any courses in wastewater collection. In the water industry, there is strong demand for trained collection system operators. This course would be designed to train operators in the practical aspects of operating and maintaining wastewater collection systems, emphasizing safe practices and procedures. The course would also focus on the knowledge, skills, and abilities required to perform the essential duties of an entry level collection system maintenance technologist and prepare students to take the California Water Environment Association (CWEA) Collection System Certification exam at a Grade I or II level. More importantly, a well-trained and knowledgeable workforce is vital to protecting public health and the environment as well as ensuring the long-term sustainability of water and wastewater systems. This course is an elective in the Water Technology degree/certificate as well as 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.

- WATR 795

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 common terminology used in the wastewater industry.
 2. Categorize the types and functions of pipes and fittings used in a wastewater collection system.
 3. Compare pipeline dimensions, pipe construction materials, direction of flow, location of valves, services, and lift stations in a wastewater collection map book.
 4. Discover basic underground location and leak detection, trenching and shoring, and back-fill and compaction methods of construction used in the field.
 5. Compare and contrast different cleaning methods and differentiate between hydraulic and mechanical cleaning methods.
 6. Classify the names and diagram the operation of common valves used in a wastewater collection system.
 7. Evaluate potential safety hazards and practice safe working habits.
 8. Perform basic mathematical calculations commonly required in wastewater collection systems.

Course Content:

(please number the outline of main topics and subtopics)

1. Duties of a collection system operator, common terminology and licensing requirements
 2. Source and characteristics of wastewater
 1. Physical and chemical aspects
 2. Biological aspects
 3. Health aspects
 4. Worker safety
 3. Collection system design and management
 1. Planning and design
 2. Types of sewers
 1. Sanitary
 2. Storm
 3. Combined
 3. Flow patterns
 1. Pressure
 2. Gravity
 3. Vacuum
 4. Lift station location
 5. Size and type of services
 6. Material composition and selection
 4. Preventive maintenance
 1. Pipeline patrol and manhole inspection
 2. Testing
 1. Air
 2. Smoke
 3. Water
 4. Pressure
 3. Valve exercising
 4. System monitoring
 5. Scheduled equipment overhauls
 6. Scheduled component replacement
 7. Cathodic protection
 5. Maps, drawings and records
 1. Basic collection system maps
 2. Plan and profile drawings
 3. Map symbols
 4. Inspection and maintenance records

- 5. Material safety data sheets
- 6. Collection system components
 - 1. Cleanouts
 - 2. Flusher branchers
 - 3. Backflow prevention
 - 4. Wyes and tees
 - 5. Taps
 - 6. Catch basins
 - 7. Inverted siphons
 - 8. Manholes
 - 9. Flow diversion boxes
- 7. Line cleaning methods
 - 1. Balling
 - 2. High velocity cleaning
 - 3. Flushing
 - 4. Sewer scooters
 - 5. Power bucket machines
 - 6. Power rodders
- 8. Chemical root control
 - 1. Biological treatments for grease
 - 2. Odor control
- 9. Inspection and quality assurance through remote television unit
 - 1. Pre-connect inspection
 - 2. Routine system inspection
 - 3. Rodding effectiveness inspection
 - 4. Main stoppage/problem solving
 - 5. Infiltration inflow testing
- 10. Pipe installation and repair
 - 1. Pipe and fitting selection
 - 2. Jobsite set-up
 - 1. Leak detection
 - 2. Underground location and smoke testing
 - 3. Traffic control
 - 3. Excavation
 - 1. Trenching and shoring
 - 2. Backfill and compaction
 - 3. Installation and repair techniques
 - 4. Lateral/service connection procedures
 - 5. Trenchless technology
- 11. Safety
 - 1. Vehicle and equipment safety
 - 1. Defensive driving
 - 2. Traffic control safety
 - 2. Manhole hazards
 - 1. Confined space
 - 2. Atmospheric hazards
 - 3. Other hazards
 - 3. Confined space safety
 - 1. Excavation safety
 - 2. Electrical safety
 - 3. Hearing and noise safety
 - 4. Fire safety
 - 5. Hazardous communication

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 wastewater topics will be used as an instructional tool to explain, differentiate and recognize terminology, sources of wastewater and issues, processes, certification process, and safety.
- **Method:** Film/video Viewing and Discussion
Integration: Videos and/or slides will be used to provide a better understanding of water or wastewater processes or activities. Videos will include on site processes such as safety issues, current issues in wastewater collection and treatment systems.
- **Method:** Discussion
Integration: Small group discussion allows for students to discuss in detail, review, and application of content. This allows for students to put into practice/use terminology, processes, and issues in the field of wastewater collection system operations.
- **Method:** Homework
Integration: Various writing assignments will be given to summarize major concepts discussed relevant to wastewater collection system operations.
- **Method:** Activity
Integration: Supplemental material will include reviews of current news articles concerning water or wastewater collection system operations such as trenchless technologies, best accepted processes for preventative maintenance, infrastructure rehabilitation/replacement, sewer design, and renewal.
- **Method:** Visiting Lecturers
Integration: Guest lecturers will enhance students comprehension by exposing students to people who are up to date in wastewater field operations and real world experience.

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:** Exams/Tests
Integration: Students will be evaluated on a variety of written assignments demonstrating an understanding of and ability to analyze and define wastewater collection systems terminology, concepts, and preventative maintenance activities to ensure uninterrupted sewer operations. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.
- **Method:** Research Projects
Integration: Students will conduct research related to concepts and skills developed throughout the course. Students will compare and contrast a variety of wastewater collection system technologies as well as operational costs. The final written work product will be graded for completeness and demonstrated mastery of the subject matter.
- **Method:** Class Participation
Integration: Small group discussion allows for students to discuss in detail, review, and application of content. This allows for students to put into practice/use terminology, processes, and issues in the field of wastewater collection system operations. The final written work product will be graded for accuracy and demonstrated mastery of the subject matter.
- **Method:** Class Work
Integration: Students will be evaluated on a variety of written assignments demonstrating an understanding of and ability to analyze and define wastewater systems terminology, concepts, and technologies. 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 such as how wastewater collection systems operate; safety; preventative maintenance; sewer design and renewal. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.
- **Method:** Homework

Integration: Written out of the classroom assignments to determine understanding of course content, terminology, and wastewater collection principles. The final written work product will be graded for accuracy, completeness, and demonstrated mastery of the subject matter.

- **Method:** Supplemental Material

Integration: Supplemental material will include reviews of current news articles concerning wastewater collection such as new technology, advances in preventative maintenance, changes in certification, and safety. 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. Read the chapter on pipeline cleaning and be prepared to describe the conditions under which hydraulic cleaning techniques would not be feasible.
2. Write a one page report on the type of work done by a collection system operator on a typical day.
3. In order to complete a sewer repair, the assigned crew had to cut out a section of sidewalk 4.0 feet wide, 800 feet long, and 4 inches thick. Determine how many cubic yards of concrete will be needed to restore the sidewalk. How many truck-loads will be needed if a truck holds 9 cubic yards?

Textbooks:

- Office of Water Programs (2018). *Operation and Maintenance of Wastewater Collection Systems, Volume 1* California State University, Sacramento. ISBN: 978-1-323-79656-6
- Mishra, A. K. (2016). *Smart Materials for Wastewater Applications* John Wiley and Sons, Inc.. ISBN: 978-1-119-04118-4
- Davis, M. L. (2002). *Water and Wastewater Engineering: Design Principles and Practice* The McGraw-Hill Companies, Inc . ISBN: 978-0-07-17138

Other Resources:

Minimum Qualification

- Environmental Technologies