

Course Outline

COURSE: WTRM 217 **DIVISION:** 50 **ALSO LISTED AS:** WTRM 117

TERM EFFECTIVE: Fall 2019 **CURRICULUM APPROVAL DATE:** 12/11/2018

SHORT TITLE: WATER USE EFFICIENCY PRACT

LONG TITLE: Water Use Efficiency Practitioner

Units	Number of Weeks		Contact Hours/Week		Total Contact Hours
3	18	Lecture:	3	Lecture:	54
		Lab:	0	Lab:	0
		Other:	0	Other:	0
		Total:	3	Total:	54

COURSE DESCRIPTION:

This course focuses upon the efficient use and conservation of water in the following contexts: overall supply and demand; utility operations and measures; residential uses and measures; commercial, institutional uses and measures; and landscape uses and measures. This course was previously listed as WTRM 117.

PREREQUISITES:

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion

05 - Hybrid

72 - Dist. Ed Internet Delayed

STUDENT LEARNING OUTCOMES:

1. Discuss the primary aspects of water supply and demand, including supplier and regulator roles, supply sources, and overall urban demand.

Measure of assessment: Exams, Homework Assignments

Year assessed, or planned year of assessment: 2018

Semester: Spring

2. Explain the major elements of water use and conservation as it pertains to residential, commercial, industrial, institutional, and agricultural uses.

Measure of assessment: Exams, Homework Assignments

Year assessed, or planned year of assessment: 2018

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 12/11/2018

3 Hours

I. Water Supply and Demand:

a. Water supplier and regulator roles and responsibilities

b. Water rights

c. Groundwater supplies

d. Surface water supplies

e. Other supplies of water (e.g., recycled water, desalination, groundwater recharge, and transfers)

Student Performance Objectives: Outline the key aspects of water supply and demand as they apply to water suppliers and regulators, water rights, and both groundwater and surface water supplies.

3 Hours

I. Water Supply and Demand:

f. Urban demand Memorandum of Understanding and best management practices

i. Single and multi-family residential

ii. Commercial

iii. Industrial

iv. Institutional

v. Irrigation

Student Performance Objectives: Explain the key aspects of water supply and demand as they apply to urban demand.

3 Hours

I. Water Supply and Demand, including:

g. Agricultural demand and Memorandum of Understanding and best management practices

h. Role of water conservation

i. Long-term versus short-term conservation programs

Student Performance Objectives: Describe the key facets of water supply and demand as they apply to agricultural demand and the role of water conservation.

3 Hours

I. Water Supply and Demand, including:

i. Urban water management plans

ii. Water shortage contingency plans

j. Major water systems (e.g., Bay Delta, Colorado River and Truckee River)

Student Performance Objectives: Explain the key aspects of water supply and demand as they apply to urban water management plans, water shortage contingency plans, and major water systems.

3 Hours

II. Utility Water demand characteristics, operations, and measures:

a. Common units of measurement

i. Gallons per capita per day

ii. Customer billing units

iii. Acre feet

iv. Million gallons

v. Cubic feet per second

Student Performance Objectives: Explain the key factors of utility water demand and its associated measures. Outline the key components of utility water demand characteristics, operations, and related performance measures.

3 Hours

II. Utility Water demand characteristics, operations, and measures:

b. Customer demand characteristics

i. User classification

ii. Demand hardening

Student Performance Objectives: Outline the key characteristics of customer demand.

3 Hours

II. Utility Water demand characteristics, operations, and measures:

c. Utility conservation measures

i. System water pressure

1. Impacts on demand

2. Public health issue

ii. Water loss control

1. System audits

2. Leak detection

3. Non-revenue water

iii. Water meters

1. Types

2. Functions

3. Accuracy

4. Leak detection

iv. Water waste ordinance

Student Performance Objectives: Outline the primary water conservation measures which can be implemented by a water utility.

3 Hours

II. Utility Water demand characteristics, operations, and measures:

d. Customer billing, cycles and rate structures

e. Conservation fixture standards

i. California, Nevada and US plumbing standards

ii. U.S. Energy Policy Act of 1992

iii. WaterSense, green building and LEED standards

Student Performance Objectives: Describe the key elements of customer billing, cycles, and rate structures as they relate to utility water demand.

3 Hours

III. Residential uses and measures:

a. Indoor end-uses of fixtures and appliances

b. Conventional, water saving and high efficiency fixture and appliance water usage

c. Leak detection, field tests and measurements

d. Indoor water conservation measures

- i. Toilets
- ii. Shower and faucet standard flow rates
- iii. Clothes washer water usage
- iv. Dishwasher water usage

Student Performance Objectives: Explain the key aspects of indoor residential water usage, including fixtures, appliances, toilets, and conservation measures.

3 Hours

III. Residential uses and measures:

- e. Outdoor water conservation measures
 - i. Pool-Spa and water features
 - ii. Outdoor cleaning
 - iii. Water-efficient irrigation and landscape
- f. Water use survey techniques, recommendations and incentives

Student Performance Objectives: Describe the primary components of outdoor water conservation measures and water usage survey techniques. Describe the key factors associated with water usage and conservation in the outdoor landscape, including water-efficient landscaping principles, water usage survey, turf-grass, and non-potable water sources.

6 Hours

IV. Commercial, industrial and institutional uses and measures:

- a. Indoor end-uses of fixtures and appliances
- b. Conventional water saving and high efficiency fixture and appliance water usage
- c. Leak detection, field tests and measurements
- d. Indoor water conservation measures
 - i. Toilets
 - ii. Shower and faucet standard flow rates
 - iii. Clothes washer water usage
 - iv. Dishwasher water usage
 - v. Treatment/water purification
 - vi. Cooling towers
 - vii. Process water

Student Performance Objectives: Explain the key aspects of indoor commercial, industrial, and institutional water usage and conservation measures.

4 Hours

IV. Commercial, industrial and institutional uses and measures:

- e. Outdoor water conservation measures
 - i. Pool-Spa and water features
 - ii. Outdoor cleaning
 - iii. Water-efficient irrigation and landscape
- f. Water use survey techniques, recommendation and incentives

Student Performance Objectives: Discuss the primary components of outdoor commercial, industrial, and institutional water usage and conservation measures.

3 Hours

V. Landscape Uses and Outdoor Measures:

- a. Soil, water and plant relationships
- b. Water efficient landscaping principles
 - i. Hydrozones
 - ii. Irrigation systems
 - iii. Appropriate plant materials

- iv. Evapotranspiration and CIMIS
- v. Weather-based irrigation controller
- vi. Soil improvement and mulching

Student Performance Objectives: Outline the key aspects of water usage in the outdoor landscape, including irrigation systems, plant material choice, and soil improvement.

3 Hours

V. Landscape Uses and Outdoor Measures:

- c. Water use survey
 - i. Water budget
 - ii. Irrigation controllers
 - iii. Irrigation efficiency
 - iv. Area measurement

Student Performance Objectives: Explain the key components of an outdoor landscape water usage survey.

3 Hours

V. Landscape Uses and Outdoor Measures:

- d. Turfgrass
 - i. Types
 - ii. Horticultural practices
 - iii. Alternatives to turfgrass
- e. Other outdoor water conservation measures

Student Performance Objectives: Describe the importance of turfgrass types, horticultural practices, and turfgrass alternatives as they relate to water conservation in the outdoor landscape.

3 Hours

V. Landscape Uses and Outdoor Measures:

- f. Non-potable water
 - i. Recycled
 - ii. Graywater
 - iii. Rain capture
- g. Water use survey techniques, recommendations and incentives

Student Performance Objectives: Explain the relevance of non-potable water types and the application of water usage survey techniques in the outdoor landscape.

2 Hours

METHODS OF INSTRUCTION:

Lecture, Discussion, Presentations

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 20.00 %

Written Homework, Report/Presentation

Problem-solving assignments

Percent of total grade: 20.00 %

Homework Problems Quizzes Exams

Objective examinations

Percent of total grade: 40.00 %

Multiple Choice True/False

Other methods of evaluation

Percent of total grade: 20.00 %

Class participation required.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 56

Assignment Description: Out-of-Class Assignments: Reading assignment in text. Study for quizzes and exams.

Required Outside Hours: 18

Assignment Description: Complete homework problems related to utility water demand and its associated measures.

Required Outside Hours: 30

Assignment Description: Report/Presentation on the key aspects of water supply and demand as they apply to urban or agricultural demand and the role of water conservation.

REPRESENTATIVE TEXTBOOKS:

Amy Vickers. Handbook of Water Use and Conservation, or other appropriate college level text.. Amherst, MA: WaterPlow Press,2017.

This is a standard text used in the water industry.

Reading Level of Text, Grade: 11th Verified by: Dana Young

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Not Transferable

UC TRANSFER:

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department:

CSU Crosswalk Course Number:

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: C

Maximum Hours: 3

Minimum Hours: 3

Course Control Number: CCC000530894

Sports/Physical Education Course: N

Taxonomy of Program: 095800