

**Course Outline**

**COURSE:** WTRM 112      **DIVISION:** 50      **ALSO LISTED AS:**

**TERM EFFECTIVE:** Fall 2018      **Inactive Course**

**SHORT TITLE:** APPLIED HYDRAULICS

**LONG TITLE:** Applied Hydraulics

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:**

Study of the hydraulics necessary in the operation of water and maintenance plants and systems. Consideration of the types of pumps used in water/wastewater service, their operational characteristics, required maintenance and the problems common to their use. This course is now listed as WTRM 212. **ADVISORY:** WTRM 101 Introduction to Water/Wastewater Technology; WTRM 102 Beginning Water/Wastewater Mathematics.

**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

**STUDENT LEARNING OUTCOMES:**

1. Outline and discuss basic fluid principles.  
 Measure of assessment: Homework assignments Quiz  
 Year assessed, or planned year of assessment: Fall 2017
2. Explain the principles of basic hydraulics.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

3. Describe the application and use of centrifugal pumps, rotary pumps, displacement pumps, and special service pumps.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

4. Explain the applications of hydraulic accumulators.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

5. Describe the power transmission application of hydraulics.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

6. List and describe hydraulic power tools used in the water industry.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

7. Explain the function and use of hydraulic cylinders.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

8. Explain the function and use of control valves.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

9. Describe the relationships between fluids, lines, and fittings.

Measure of assessment: Homework assignments Quiz

Year assessed, or planned year of assessment: Fall 2017

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

Inactive Course: 11/13/2017

6 Hours

Content: Basic fluid principles

Student Performance Objectives (SPO): Explain the foundation of fluid principles which support hydraulic theory.

Out-of-Class Assignments: Read Chapter 1 of Miller Book. Answer assigned review questions.

6 Hours

Content: Principles of basic hydraulics.

Student Performance Objectives (SPO): Describe the practical application of water hydraulic theory in a water utility environment

Out-of-Class Assignments: Read Chapter 2 of Miller Book. Answer assigned review questions.

6 Hours

Content: Centrifugal pumps, Rotary pumps, displacement pumps, and special service pump applications.

Student Performance Objectives (SPO): Explain the construction, and operation of different types of pumps used in the water industry

Out-of-Class Assignments: Read Chapters 3-6 of Miller Book. Answer assigned review questions.

3 Hours

Content: Hydraulic Accumulators

Student Performance Objectives (SPO): Describe the different storage devices that store liquid under pressure and explain how liquid stored under pressure can be used to accomplish work.

Out-of-Class Assignments: Read Chapter 7 of Miller Book. Answer assigned review questions.

3 Hours

Content: Power transmission application of hydraulics

Student Performance Objectives (SPO): Describe fluid drives and liquid drives involving couplings and explain how they work.

Out-of-Class Assignments: Read Chapter 8 of Miller Book. Answer assigned review questions.

6 Hours

Content: Mid-Term Exam - Review

Student Performance Objectives (SPO): Explain the principles and applications of basic hydraulic theory.

Out-of-Class Assignments: Review concepts covered to date.

3 Hours

Content: Hydraulic power tools used in the water industry

Student Performance Objectives (SPO): Identify different hydraulic tools using hydraulics with an emphasis on tools used for pipe and appurtenance repairs.

Out-of-Class Assignments: Read Chapter 9 of Miller Book. Answer assigned review questions.

9 Hours

Content: Control Valves

Student Performance Objectives (SPO): Describe the applications of different types of hydraulic and pneumatic control valves used to control water levels

Out-of-Class Assignments: Read Chapter 11-12 of Miller Book. Answer assigned review questions.

9 Hours

Content: Fluids, Lines, and fittings

Student Performance Objectives (SPO): Discuss the key issues associated with the installation and specifications of fluid lines, and fittings used in a hydraulic environment, including water line specifications for services, and main water distribution.

Out-of-Class Assignments: Read Chapter 13-14 of Miller Book. Answer assigned review questions.

2 Hours

Final

#### **METHODS OF INSTRUCTION:**

Lecture Presentation and Instruction Video presentations Guest Lecturer Off-site Field Trip Take-home work problem work sheets with sample problems to be graded and discussed in class.

#### **METHODS OF EVALUATION:**

Writing assignments

Percent of total grade: 0.00 %

Course primarily involves skill demonstration or problem solving

Problem-solving assignments

Percent of total grade: 40.00 %

Percent range of total grade: 40 % to 60 % Homework Problem

Objective examinations

Percent of total grade: 40.00 %

#### **REPRESENTATIVE TEXTBOOKS:**

Recommended Representative Textbooks

Rex Miller and Mark R. Miller . Industrial Electricity and Motor Controls, Second Edition, or other appropriate college level text. . McGraw-Hill Publishing,2013.

This text is an industry standard text.

ISBN: 9780071818698

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

Required Other Texts and Materials

Rex Miller and Mark R. Miller, Audel Pumps and Hydraulics, 6th Edition, Wiley Publishing, ISBN: 0764571168. This text is a standard text in the water industry.

## **ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 201230

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: WTRM

CSU Crosswalk Course Number: 112

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: CCC000529237

Sports/Physical Education Course: N

Taxonomy of Program: 095800