

Clackamas Community College

Online Course/Outline Submission System

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Section #1 General Course Information**Department:** Engineering Science**Submitter**First Name: **James**Last Name: **Nurmi**Phone: **3813**Email: **jamesn****Course Prefix and Number:** WET - 021**# Credits:** 3**Contact hours**

Lecture (# of hours): 33

Lec/lab (# of hours):

Lab (# of hours):

Total course hours: 33

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Waterworks Operations II**Course Description:**

For professional upgrade only. Does not meet the requirements for the certificate or degree. Basic hydrology, ground water and surface water sources, well construction and operation, introduction to water chemistry, waterworks hydraulics, and fundamentals of pumps and pumping.

Type of Course: Career Technical Supplementary

Can this course be repeated for credit in a degree?

No

What is the target audience/industry for this class?

Water Industry

Are there prerequisites to this course?

No

Are there corequisites to this course?

No

Are there any requirements or recommendations for students taken this course?

No

Are there similar courses existing in other programs or disciplines at CCC?

No

Will this class use library resources?

Yes

Have you talked with a librarian regarding that impact?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: Yes

When do you plan to offer this course?

✓ Winter

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. describe the fundamentals of water chemistry, including a review of the atomic structure of matter, the classification of matter, chemical formulas of common chemicals used in the water industry, characteristics of acids, bases and salts, and the relationship between pH, alkalinity and water stability;
2. solve a variety of chemical dosage problems common to water treatment and disinfection,
3. identify the differences between surface and groundwater sources of drinking water,
4. describe the fundamentals of water wells, including proper well construction methods, basic components of municipal water wells, fundamentals of hydrogeology, aquifer protection, and groundwater locations methods;
5. explain the water quality characteristics of groundwater and surface water, including typical treatment methods used to remove or alter contaminants in groundwater and surface water;
6. describe surface water techniques used in the Pacific NW, including an understanding of the chemicals and processes used during coagulation, sedimentation, and filtration,
7. describe the fundamentals of centrifugal pumps, including pump components and function, pump performance curves, pumping configurations, affinity laws, pump cavitation, packing and mechanical seals, and pump troubleshooting techniques.

This course does not include assessable General Education outcomes.

Major Topic Outline:

1. Introduction to water chemistry.
2. Basic relationships of water hardness, alkalinity and pH.
3. Introduction to drinking water sources: groundwater and surface water.
4. Secondary maximum contaminants of importance in drinking water.
5. Introduction to waterworks industry chemical dosage problems.
6. Fundamentals of hydrogeology and groundwater protection.
7. Characteristics of groundwater and common treatment techniques.
8. Characteristics of surface water and common treatment techniques.
9. Introduction to centrifugal pump concepts.
10. Centrifugal pump operation and troubleshooting.
11. Practical applications of centrifugal pumps in the waterworks industry.

Does the content of this class relate to job skills in any of the following areas:

- | | |
|--------------------------------------|-----------|
| 1. Increased energy efficiency | No |
| 2. Produce renewable energy | No |
| 3. Prevent environmental degradation | No |
| 4. Clean up natural environment | No |
| 5. Supports green services | No |

Percent of course: 0%

First term to be offered:

Specify term: Winter 2016
