

**Clackamas Community College**

## Online Course/Outline Submission System

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**Section #1 General Course Information****Department:**Engineering Science**Submitter**

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**Course Prefix and Number:**WET - 241

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**# Credits:**4**Contact hours**

Lecture (# of hours): 33

Lec/lab (# of hours):

Lab (# of hours): 33

Total course hours: 66

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.

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**Course Title:**Aquatic Microbiology**Course Description:**

A lab course with topics in applied microbiology. Methods to detect coliform group in water and wastewater. Identification of filamentous bacteria in activated sludge, and identification of indicator protozoa in activated sludge. A bacteriological stream survey project is included.

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**Type of Course:**Career Technical Preparatory

Is this class challengeable?

**Yes**

Can this course be repeated for credit in a degree?

**No**

Is general education certification being sought at this time?

**No**

Does this course map to any general education outcome(s)?

**No**

Is this course part of an AAS or related certificate of completion?

**Yes**

**Name of degree(s) and/or certificate(s):**Water Quality AAS

Are there prerequisites to this course?

**Yes**

**Pre-reqs:**Pass BI-204

**Have you consulted with the appropriate chair if the pre-req is in another program?**

**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?

**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?

✓ Fall

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. explain the beneficial and detrimental roles of microscopic life forms-the microlife- found in wastewater treatment processes,
2. identify properties of an ideal water quality indicator organism and discuss how current bacteriological indicator organisms are used to measure water quality,
3. describe and perform both historical and current laboratory techniques used in the water industry,
4. explain the chemical and biological actions of selective media used in water bacteriology,
5. describe the difference between sterilization and disinfection and explain how various methods are used to materials used in the water industry,
6. demonstrate serial dilution techniques as a part of the bacteriological examination of water,
7. perform a variety of bacteriological tests including: membrane filtration for total and fecal coliform, MPN multiple tube fermentation method, MMO-MUG method, Presence/Absence Broth method, Quanti-Tray/Colilert and the novel polymerase chain reaction (PCR) methods;
8. explain the interpretation of various bacteriological species and concentration found in natural waters and how that is used to assess recreational and wastewaters,
9. identify common protozoa associated with the activated sludge treatment process, and explain the significance of various predominant indicator organisms;
10. identify common filamentous bacteria associated with bulking in activated sludge treatment plants and describe methods of controlling filamentous bacteria.

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***This course does not include assessable General Education outcomes.***

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Major Topic Outline:

1. Introduction to the ideal indicator concepts. Historical methods of bacteriological testing of water and wastewater.
2. Introduction to membrane technology. Methods used in sterilization of microbiological equipment. Distribution system bacteriological testing.
3. Bacteriological test methods and media use in the water industry. Active ingredients and mechanisms of action. Use of 4 basic methods to identify bacteria.
4. Membrane methods for fecal coliform and total coliform bacteria. Introduction to the serial dilution technique.
5. Introduction to the mpn multiple tube fermentation method for enumerating coliform bacteria.

6. Introduction to activated sludge process control. Fundamentals of the control of filamentous bulking bacteria using selector concepts.
7. Introduction to the identification of filamentous bacteria found in activated sludge. Use of the dichotomous key.
8. Introduction to activated sludge protozoan indicator organisms. Use of the dichotomous key to ciliated protozoa commonly found in activated sludge.
9. Review of waterborne infectious disease organism, and current epidemiological data from Oregon's Health Division on waterborne disease outbreaks.
10. Microscope use to identify activated sludge microorganisms. Introduction to sludge quality by microscope evaluation.

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

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

Percent of course:0%

First term to be offered:

**Next available term after approval**

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