

Clackamas Community College

Online Course/Outline Submission System

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Section #1 General Course Information**Department:** Engineering Science**Submitter**First Name: **Matthew**Last Name: **LaForce**Phone: **3148**Email: **laforce****Course Prefix and Number:** WET - 020**# 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: Wastewater Operations II**Course Description:**

For professional upgrade only. Does meet the requirements for the certificate or degree. Secondary wastewater treatment alternatives with municipal application. Fixed and suspended film systems and clarification process. Includes biological sludge treatment.

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?

wastewater operators

Are there prerequisites to this course?

Yes

Pre-reqs: Pass WET-010

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?

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. understand the principles involved with the fixed film processes,
 - a. trickling filters,
 - b. rotating biological contactors,
 - c. activated bio-filters;
2. understand the principles and practices in the operation of suspended film processes,
 - a. activated sludge,
 - b. ponds and lagoons;
3. understand the problem solving methods that allow for quantification of the operational strategies as applied to the biological treatment of wastewater,
 - a. resolution of pounds formula, and mass flux of waste materials;
 - b. Sludge Ages (SATSS, SABOD),
 - c. Mean Cell Residence Time (MCRT),
 - d. Food to Micro-organism Ratio (F/M),
 - e. Recirculation Ratio (Rr),
 - f. Hydraulic Loading/Overflow Rates (HLR, HOR),
 - g. Organic Loading Rate (OLR),
 - h. Surface Loading/Overflow Rate (SLR, SOR),
 - i. Weir Loading/Overflow Rate (WLR, WOR).

This course does not include assessable General Education outcomes.

Major Topic Outline:

1. Understand the principles involved with the FIXED film processes:
 - a. Trickling Filters (TF).
 - b. Rotating Biological Contactors (RBC).
 - b1. Mechanically Operated.
 - b2. Air actuated.
 - b3. Submerged.
 - c. Activated Bio-Filters (ABF).
2. Understand the principles and practices in the operation of SUSPENDED film processes:
 - a. Packaged Plants and Oxidation Ditches.
 - b. Conventional Activated Sludge Process.
 - c. Modifications to the A/S Process.
 - d. Lagoons and Ponds.
 - d1. Facultative Lagoons.
 - d2. Anaerobic Ponds.
3. Understand biological volume reduction of sludges and the solids handling process.
 - a. Aerobic and Anaerobic Sludge Treatment.
 - b. Solids/Sludge Processing Equipment.
4. Understand the problem solving methods that allow for resolution of:
 - a. Pounds Formula, Mass Flux of Material.
 - b. Sludge Ages, SATSS, SABOD.
 - c. Mean Cell Residence Time, MCRT.
 - d. Food to Micro-organism Ratio, F/M.
 - e. Recirculation Ratio, Rr.

- f. Hydraulic Loading / Overflow Rate, HLR, HOR.
- g. Organic Loading Rate, OLR.
- h. Surface Loading / Overflow Rate, SLR, SOR.
- i. Weir Loading / Overflow Rate, WLR, WOR.

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:

Next available term after approval

:
