CIVIL ENGINEERING
Lassonde School of Engineering
Civil Engineering
LE / CIVL 4043 3.0 SECTION A
ADVANCED SANITARY ENGINEERING
FALL 2017 / WINTER 2018

Last Modified Date: 08/17/2017

COURSE CALENDAR DESCRIPTION

This course introduces advanced topics in the discipline of sanitary/environmental engineering, including design of lime soda ash softening in drinking water treatment, design of biological wastewater treatment systems, and sludge and residual solids management in water and wastewater treatment. An introduction to tertiary wastewater treatment is also provided along with a discussion of solids and biosolids management and disposal issues. Prerequisites: LE/CIVL 3240 3.00

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Eldyasti, Ahmed</td>
<td>Sec. A / LECT / F</td>
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TOPICS AND CONCEPTS

The purpose of this course is to provide the students with the advanced design of in drinking water treatment including but not limited to lime soda ash softening and GAC Biofilters. This course introduces the student to aspects of molecular biology of water and wastewater engineering processes and will be focusing on the genes and genome, DNA, and microbial background that can help the students to apply this knowledge of microbiology to the design of water and wastewater engineering systems. The biological wastewater treatment process including aerobic and anaerobic treatment process for wastewater with a focus on the advanced bioelectrochemical technology to generate bioenergy from wastewater and biosolids. On successful completion of this course, the students will be able to design advanced water and wastewater systems and have a reasonable working knowledge and hands-on experiences that can be used to devise and design the efficient, cost-effective treatment and water reuse systems, and properly identify the critical issues and challenges in planning, design and operation of modern wastewater treatment facilities.

Topics covered in this course:

- Introduction to simple genes and genome, DNA, and microbial background
  Definition, feature, classifications, morphology, cell size, cell structure, and cytoplasmic membrane of microorganisms.
- Understanding of biochemical reactions occurring in wastewater treatment processes including utilization of various non-inhibitory biokinetic models both in suspended-growth and attached-growth bioreactors.
- Design and calculation of the advanced bioelectrochemical technology to generate bioenergy from wastewater and biosolids including: microbial fell cells (MFC), biocatalyzed electrolysis cells (BECs); and microbial electrolysis cells (MECs), etc.
- Advanced solutions for commercial wastewater pollution problems.
- Modeling of advanced water and wastewater treatment processes using BioWin® and GPS-X software

LIST OF LEARNING OUTCOMES AND EXAMPLES OF
COURSE LEARNING OBJECTIVES
By the end of the course, students should be able to:

• Apply fundamental principles of biological component occurring in tertiary wastewater treatment processes.
• Describe and design advanced water and wastewater treatment systems for municipalities and industry
• Identify key components of the biological and modern for water pollution
• Obtain a solid foundation of the Biotechnology and the contribution of it in the climate change and different engineering technologies to control this pollution and even generate bioenergy.
• Improve communication and teamwork skills through individual written assignments, working on a group project, and delivering a group presentation

COURSE LEARNING OUTCOMES
Learning outcomes articulate what the student will achieve by the end of the course. They provide a framework for assessment by stating what you expect the learners to be able to demonstrate after completing the course.

A succinct learning outcome specifies the tasks students are expected to be able to perform and the level of competence expected for the tasks.

By the end of the course, students will be able to:

1. Recognize the importance of tertiary and advanced for water pollution
2. Recognize the major parts of the bioenvironmental processes
3. Identify the function of various tertiary and advanced water and wastewater treatment processes
4. Design tertiary and advanced water and wastewater treatment processes
5. Integrate various unit processes and operations into an overall treatment train
6. Predict potential environmental and/or safety risks and benefits with respect to water treatment solutions

GRADED ASSESSMENT

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<tr>
<td>Assignments:</td>
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<td>Lab Report:</td>
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<td><strong>TOTAL</strong></td>
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ADDITIONAL INFORMATION

REQUIRED TEXT

SUGGESTED TEXT

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty
• Academic Integrity

STUDENT LINKS
• Student Rights and Responsibilities
• Religious Observance
• Academic Accommodation for Students with Disabilities
• Counselling and Disability Services

Many courses utilize Moodle, York University's course website system. If your course is using Moodle, click here to access it.

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