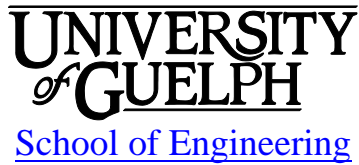


ENGG*4770 Course Physical & Chemical Treatment

Fall 2015



(Revision 0: September 10, 2015)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Emily Chiang, Ph.D., P.Eng.
Office: THRN 3507, ext. 58217
Email: chiange@uoguelph.ca
Office hours: Wednesday 10:30pm to 11:30pm or by appointment

1.2 Lab Technician

Technician: Joanne Ryks
Office: THRN 1114, ext. 54087
Email: jryks@uoguelph.ca

1.3 Teaching Assistants

<u>GTA</u>	<u>Email</u>	<u>Office Hours</u>
Shoaib Saleem	saleems@uoguelph.ca	TBA on Courselink

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*4770 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

No textbook will be mandatory. Students are encouraged to make use of textbooks used in earlier courses as well as textbooks that are available from the library.

2.3 Recommended Resources

Metcalf & Eddy, Inc. (2014). *Wastewater Engineering: Treatment and Resource Recovery*, 5th edition, McGraw Hill, Inc., New York, NY, 2018p.

Davis, M.L. (2010). *Water and Wastewater Engineering: Design Principles and Practice*. McGraw Hill, Inc., New York, NY.

Droste, R.L. (1997). *Theory and Practice of Water and Wastewater Treatment*. John Wiley & Sons, New York, NY, 800p.

Grady, C.P.L., Jr., Gaigger, G.T. and Lim, H.C. (1999). *Biological Wastewater Treatment*. 2nd edition, Marcel Dekker, New York, NY, 1076p.

Henze, M., van Loosdrecht M.C.M., Ekama, G.A., Brdjanovic, D. 2008. *Biological Wastewater Treatment: Principles, Modelling and Design*. IWA Publishing, London, UK, 511p.

Metcalf & Eddy, Inc. (2006). *Water Reuse: Issues, Technologies and Applications*, McGraw Hill, Inc., New York, NY, 1570p.

Qasim, S.R. (1999). *Wastewater Treatment Plants: Planning, Design, and Operation*. Technomic Pub. Co, Lancaster, PA, 1107p.

Recommended Standards for Wastewater Facilities. 1997 Edition, The Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Albany, NY.

Reynolds, T.D. and Richards, P.A. (1996). *Unit Operations and Processes in Environmental Engineering*, 2nd Edition, PWS Publishing Co. Boston, MA, 798p.

Viessman, W. Jr., Hammer, M.J., Perez, E.M. and Chadik, P.A. (2009). *Water Supply and Pollution Control*. Pearson Prentice Hall, Upper Saddle River, NJ, 843p.

WEF and ASCE, (1998). *Design of Municipal Wastewater Treatment Plants*, Vol. 1, 2 and 3, 4th Edition, Alexandria, VA.

WEF and IWA, (2003). *Wastewater Treatment Plant Design*. Edited by A. Vesilind, Water Environment Federation, Alexandria, VA.

REFEREED JOURNALS

Water Research

Water Environment Research

American Water Works Association Journal

Journal of Environmental Engineering, ASCE

2.4 Additional Resources

Lecture Information: All the lecture notes are posted on the Courselink throughout the semester.

Lab Information: The information for all the labs will be posted on the Courselink.

Project and Assignments: The information for all the design projects and assignments will be posted on the Courselink. Download them according to the schedule given in this handout.

Miscellaneous Information: Other information related to the course is also posted on the Courselink.

2.5 Communication & Email Policy

Please use lectures and lab help sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

3 ASSESSMENT

3.1 Dates and Distribution

Labs: 20% (equally distributed among labs)

Due at the end of each lab period unless otherwise stated

Assignments: 30% (equally distributed among assignments)

Assignment 1: Fri, Sept 30, in class

Assignment 2: Mon, Oct 31, in class

Assignment 3: Fri, Nov 18, in class

Note: Only hardcopies are to be submitted

Group Design Project: 50%

Presentation (15%): Wed, Nov 30 and Fri, Dec 2, in class and lab

Final Report (35%): December 14th, 2016

Note: Both paper and electronic copies are to be submitted

3.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. Please see below for specific details and consult the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:
<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

Passing grade: In order to pass the course, you must pass both the laboratory and the assignment course portions. Students must obtain a grade of 50% or higher on the laboratory and assignment portions of the course in order for the group project portion of the course to count towards the final grade.

Missed submissions: Missed submissions will not be accepted, and there will be no makeup.

Lab Work: You must attend and complete all laboratories. If you miss a laboratory due to grounds for granting academic consideration or religious accommodation, arrangements must be made with the teaching assistant to complete a makeup lab.

Late submissions: Late submissions will not be accepted.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course focuses on the theory, application, and design principles of physical and chemical operations and processes for the treatment of water and wastewater. This involves the design of physical and chemical unit operations, and evaluating the optimum combination to satisfy the given design constraints and criteria. The optimum designs integrate engineering science, basic science, economics, and health and safety for workers and the public.

Prerequisite(s): ENGG*3590

4.2 Course Aims

The goal of this course is to provide the students with the theories and practices for the planning, design and operation of commonly used wastewater treatment facilities. Emphasis will be placed on integrating individual unit operations and processes to achieve multiple treatment objectives while satisfying the economic, environmental and societal constraints.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. properly identify the critical issues and challenges in planning, design and operation of modern wastewater treatment facilities to meet not only current but also anticipated regulatory requirements,
2. develop 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

- gain the independent learning skills and enhance your ability to work effectively in teams through problem based learning format.

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering	1, 2	Projects, assignments, labs
2. Problem Analysis	1, 2	Projects, assignments, labs
3. Investigation	1, 2	Projects, assignments, labs
4. Design	1, 2	Projects, labs
5. Use of Engineering Tools	1, 2	Projects, assignments, labs
6. Communication	1, 2, 3	Projects
7. Individual and Teamwork	3	Projects, assessments, labs
8. Professionalism	1	Projects
9. Impact of Engineering on Society and the Environment	1, 2	Projects
10. Ethics and Equity	-	-
11. Environment, Society, Business, & Project Management	1, 2, 3	Projects, assignments
12. Life-Long Learning	1, 2, 3	-

4.5 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and project.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.7 Relationships with other Courses & Labs

Previous Courses:

ENGG*2560: mass balance analysis for steady state and unsteady state situations, reactor types and analysis, reaction equilibrium and kinetics

ENGG*31X: some design tools, writing and public speaking techniques, codes, safety issues, environmental assessment and professional management

ENGG*3590: water quality, basic theories of physical, chemical and biological treatment processes

Follow-on Courses:

None

5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:

Monday	11:30 – 12:20	MINS 103
Wednesday	11:30 – 12:20	MINS 103
Friday	11:30 – 12:20	MINS 103

Laboratory:

Wednesday	Sec 01	8:30 – 10:20	THRN 1116
Friday	Sec 02	9:30 – 11:20	THRN 1116

5.2 Lecture Schedule (Tentative)

Weeks	Lecture Topics	Learning Objectives
0.5	Wastewater treatment overview	1, 2
1.5	Fundamentals of wastewater treatment and reuse	1
1	Hydraulic Engineering	1,2
1	Preliminary Treatment	2,3
1.5	Primary Treatment	2,3
3	Physical-chemical processes	2,3
2	Disinfection, Reoxygenation, and odor control	2,3
1.5	Other industrial wastewater treatment	2,3

5.3 Lab Schedule

Section:	Time	Location
0101	Wednesday 8:30 – 10:20pm	THRN 1116
0102	Friday 9:30 – 11:20pm	THRN 1116

The main purposes of the design labs include: 1) to demonstrate and practice calculations required for designing and optimizing wastewater treatment facilities, 2) to provide more informal discussions among

the group students to resolve the issues arising from the design projects and ask the questions about lectures and previously assigned reading materials which require clarification, and 3) to introduce selected regulatory design guidelines and standards currently employed by provincial, federal and international agencies.

5.4 Other Important Dates

Thursday, September 8th, 2016: First day of class

Monday October 10th, 2016: Thanksgiving Holiday, no classes or labs

Tuesday, October 11th, 2016: Study Break Day, no classes or labs

Friday, November 4th, 2016: drop date – 40th class day

Thursday, December 1st, 2016: scheduled as a Tuesday

Friday, December 2nd, 2016: scheduled as a Monday, last day of classes

6 LAB SAFETY

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

If the laboratory rules are not followed, consequences will include removing student's access to the lab. If this results in lab work not being completed, the student will receive a grade of 0.

7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:

<http://www.academicintegrity.uoguelph.ca/>

Please also review the section on Academic Misconduct in your [Engineering Program Guide](#).

The School of Engineering has adopted a Code of Ethics that can be found at:

<http://www.uoguelph.ca/engineering/undergrad-counselling-ethics>

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at [519-824-4120](tel:519-824-4120) ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

9 RECORDING OF MATERIALS

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10 RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>