Department of Civil Engineering
McMaster University

CIV ENG 2B04: Principles of Environmental Engineering

Fall 2017

Instructor:
Dr. Zoe Li  Office: JHE 335  Ext: 21225  E-mail: zoeli@mcmaster.ca

Teaching Assistants:
TBA

Laboratory Technician:
Monica Han  Office: JHE 201/A  Ext: 27074  E-mail: hanm7@mcmaster.ca

Communication, Attendance and Schedule:
The major form of communication in this course will be the classroom. Therefore, course attendance is expected. There is also an avenue to learn site, where course notes, assignments, solutions etc... will be posted. Additionally, there is a discussion board on the avenue site where you can communicate with each other, me, the TAs and Monica regarding the assignments, labs, exams, etc... The schedule for this course will be posted on avenue, including lectures, tutorials, laboratories and examinations. The schedule may change slightly throughout the term, and any changes will be announced in class and on avenue.

Graduate Attributes (GAs) Measured in this Course:
The following Graduate Attributes (GAs) are being measured in this course. While some other GAs are also relevant to this course, they are not being measured in this course and therefore are not listed here.
7: Communication
  7.1 Demonstrates an ability to respond to technical and non-technical instructions and questions.
  7.2 Presents instructions and information clearly and concisely.
13: Sustainability
  13.1 Triple bottom line: an ability to design and evaluate complex open-ended engineering systems using a triple-bottom line of sustainability dimensions: social, economic and environmental.
  13.2 Metrics and Tools: demonstrate an understanding of and ability to use and interpret sustainability metrics and tools.

Learning Objectives:
When this course is complete, the student will be able to (corresponding GAs in brackets):
1. Sustainability: apply the three pillars of sustainability to engineering projects, and have an understanding of the metrics used to evaluate sustainability. (13.1, 13.2)
2. Material Balances: develop a differential equation describing the change in material concentration in a system over time, and solve problems with specific boundary conditions. (7.1, 7.2)
3. Reactions: describe basic chemical concepts, be familiar with concentration units, understand chemical equilibrium and reaction kinetics. (7.1, 7.2)
4. Reactors: understand the boundary conditions of batch, continuous flow stirred tank, and plug flow reactors; develop material balance equations for each of these kinds of reactors, and use these reactors to develop models of natural systems. (7.1, 7.2)
5. Water Quality: know the categories and sources of contaminants, be familiar with the acceptable concentration ranges of various contaminants, and be familiar with several case studies involving serious cases of water contamination. (7.1, 7.2)
6. Drinking Water Treatment: obtain a basic understanding of the physical and chemical processes behind each stage of the conventional drinking water treatment process, as well as basic knowledge of provincial legislation governing drinking water treatment. (7.1, 7.2)
7. Wastewater Treatment: obtain a basic understanding of the physical and chemical processes behind each stage of the conventional sewage treatment process, as well as basic knowledge of municipal, provincial and federal legislation governing wastewater treatment. (7.1, 7.2)

Note that the first two learning objectives will be applied to all topics addressed in this course.

Course Evaluation:
Assignments: 12%
Project: 8%
Tutorials: 10%
Laboratory Reports: 20%
Mid-term Exam: 20%
Final Exam¹: 30%

Course Textbook:
The purchase of the course textbook is highly recommended.

Additionally, there are numerous text books on environmental engineering available in the Thode Library.

Course Notes:
Course notes will be posted on avenue in sections over the duration of the term. You may print these notes and add the necessary details during class, or you can take your own notes in class. The course notes are not intended to replace class or the textbook.

Examinations:

¹ You must pass the final exam to pass the course
There will be two examinations in this course: a mid-term and a final. The final examination will test cumulative knowledge from the entire term, and you must pass the final examination to pass this course. The McMaster Standard Calculator (Casio fx991) may be used on examinations.

Assignments:
This course will require the completion of four-six assignments. The assignments will be posted on the avenue site a minimum of one week before they are due. Assignments are to be submitted in the mailbox outside of JHE 302. Assignment solutions will be posted on the avenue site one week after the due date. Late assignments will be penalized 10% per day, up to a maximum of 70% at which point they will receive a grade of zero (since the solutions will be released). NOTE: if you are submitting an assignment late, you must have it date and time stamped and signed in the Civil Engineering Office prior to putting it in the drop box so the TA knows how much to deduct from the final grade. Failure to do so will likely result in a grade of zero, as the TAs do not check the drop box daily.

Tutorials:
The tutorial sessions will be an important part of this course (as reflected in the marking scheme), and will be centered on problem-based learning. Tutorials will not take place every week; the tutorial schedule will be post on avenue.

Laboratory Experiments:
As part of this course, each student must participate in four mandatory laboratory experiments. The labs provide supplemental exposure to several of the concepts we will be covering over the course of this term. The dates that these labs will be run have been posted on the avenue calendar.

Lab experiments will be conducted in groups of four. Students may form groups with members of their own laboratory section during the laboratory introduction sessions, which will be run during the week of September 12th. All group members must participate in all labs; attendance will be taken.

Each group is responsible for submitting a report for each lab. Each group member is expected to take the lead in the preparation of one report, which will be worth 11% of that student’s final grade; the remaining three laboratory reports will make up 3% of that student’s final grade each. All group members are expected to take part in the report preparation, and a statement describing the contribution of each team member should be included in the report.

A formal report structure is expected for each laboratory write-up. Suppose that you are working as a professional engineer, and prepare your laboratory reports accordingly. Guidelines for the report structure and the marking scheme are available under the Laboratory link on avenue. Follow these guidelines carefully to achieve the best possible grade on your laboratory reports. Late laboratory reports will receive a penalty of 10% per day late with no exceptions. Lab work missed due to illness or personal circumstances may be made up, if scheduling permits. You must submit the appropriate documentation through MSAF or the Associate Dean’s office. It is your responsibility to follow up with the laboratory technician (Monica). No grade will be entered for the missed work without approval.

Laboratory Safety:
The Faculty of Engineering is committed to McMaster University’s Workplace and Environmental Health and Safety Policy which states: "Students are required by University policy to comply with all University health, safety and environmental programs". It is your responsibility to understand
McMaster University Workplace and Environmental Health and Safety programs and policies. For information on these programs and policies please refer to McMaster University Environmental and Health Support Services Occupational Safety Risk Management Manual at: http://www.workingatmcmaster.ca/med/document /Lab-Safety-Handbook-1-36.pdf. It is also your responsibility to follow any specific Standard Operating Procedures (SOPs) provided for some of the experiments and the laboratory equipment.

The safety requirements for JHE 220 are listed below. Students not abiding by these safety requirements will be given one warning. Second offences will result in the student being asked to vacate the laboratory, and receiving a grade of zero for that particular lab.

- Glasses or safety glasses/goggles must be worn in the lab at all times
- Contact lenses are not to be worn in the lab.
- No short (i.e., above the knee) pants or skirts are permitted in the lab – lab coats must be worn over top of your clothing in these instances.
- Closed-toe shoes must be worn at all times.
- No loose clothing allowed.
- Long hair must be tied back.
- Gloves must be worn when working with hazardous chemicals (as indicated by the laboratory instructor).

**Academic Integrity:**
You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

**avenue:**
In this course we will be using avenue. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the
same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

**Academic Accommodation of Students with Disabilities:**
Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Policy for [Academic Accommodation of Students with Disabilities](#).