



# ENGG\*4510 Assessment and Management of Risk

01

Winter 2024

Section(s): C01

School of Engineering

Credit Weight: 0.50

Version 1.00 - January 04, 2024

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## 1 Course Details

### 1.1 Calendar Description

This course will develop the bases by which risk to human health and the environment can be assessed. Issues of hazardous waste cleanups, permitting of water and air discharges, food safety, flood protection, as examples, are addressed. The course also examines how decisions are made to manage the risks to acceptable levels.

**Pre-Requisites:**

STAT\*2040 or STAT\*2120

**Restrictions:**

Non-BENG students may take a maximum of 4.00 ENGG credits.

### 1.2 Course Description

The course will progress through the following material:

- The concept of risk as understood by the general public and how risk assessments, conducted in a scientific way, can communicate to the general public, to establish the context for engineering risk assessment and management.
- Statistical concepts which are essential for understanding environmental data, determining which data might still be needed for decision-making, examination of distributional assumptions and how these are used to characterize inputs to risk assessment methodologies.
- Exposure assessments in human health and the environment, considering bio-accumulation, bio-magnification, ecological modeling, and dose-response methodologies as inputs to engineering risk assessments and management.
- Quantitatively characterize risk associated with engineering issues as inputs to human health and the environment.

## 1.3 Timetable

Times and room locations are subject to change. Please see WebAdvisor for the latest information.

### Lectures

Tuesday/Thursday - 8:30-9:50 AM - MACN 113

### Tutorials

Sec 01: Monday 4:30 – 5:20 PM - MCKN 228

Sec 02: Tuesday 2:30 – 3:20 PM - MCKN 228

Sec 03: Friday 11:30 – 12:20 PM - MCKN 228

## 1.4 Final Exam

Saturday, April 20, 2024 11:30 AM - 1:30 PM

Exam time is subject to change. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

### 2.1 Instructional Support Team

<b>Instructor:</b>	Cam Farrow Ph.D.
<b>Email:</b>	cfarrow@uoguelph.ca
<b>Telephone:</b>	+1-519-824-4120 x53838
<b>Office:</b>	RICH 1515
<b>Office Hours:</b>	Open door policy or by appointment.

### 2.2 Teaching Assistants

<b>Teaching Assistant (GTA):</b>	Tianying Li
<b>Email:</b>	tianying@uoguelph.ca
<b>Teaching Assistant (GTA):</b>	Adya Dash
<b>Email:</b>	adash@uoguelph.ca

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## 3 Learning Resources

### 3.1 Required Resources

#### Course Website (Website)

Course material, news, announcements, and grades will be regularly posted to the ENGG\*4510 Courselink site. You are responsible for checking the site regularly.

### 3.2 Recommended Resources

#### Risk Assessment: Procedures and Protocols (Textbook)

Risk Assessment: Procedures and Protocols. E. McBean, 2019. John Wiley & Sons.

## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Use the knowledge of everyday risks in society, to establish the context of risk assessment and management of engineering risk, as it pertains to human health and the environment.
2. Assemble, interpret, and analyze environmental data as a basis from which risk assessments can be developed, including fate and transport concerns associated with engineering risk.
3. Identify strategies which can be used to determine if the collection of additional data are warranted.
4. Understand how to access various data sources from epidemiology and toxicology as inputs to engineering risk assessments.
5. Develop plans for appropriate engineering risk assessment and management, reflecting legal, economic, and socioeconomic considerations.

### 4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
1	Knowledge Base	1, 2, 3, 4, 5
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2, 3, 4, 5
1.4	Recall, describe and apply program-specific engineering principles and concepts	1, 2, 3, 4, 5
2	Problem Analysis	1, 2, 3, 4

#	Outcome	Learning Outcome
2.1	Formulate a problem statement in engineering and non-engineering terminology	1, 2, 3, 4
2.2	Identify, organize and justify appropriate information, including assumptions	1, 2, 3, 4
2.3	Construct a conceptual framework and select an appropriate solution approach	1, 2, 3, 4
2.4	Execute an engineering solution	1, 2, 3, 4
2.5	Critique and appraise solution approach and results	1, 2, 3, 4
7	Communication Skills	1, 2, 3, 4, 5
7.1	Identify key message(s) and intended audience in verbal or written communication as both sender and receiver	1, 2, 3, 4, 5
7.5	Demonstrate ability to process oral and written communication by following instructions, actively listening, incorporating feedback, and formulating meaningful questions	1, 2, 3, 4, 5
9	Impact of Engineering on Society and the Environment	1, 2, 3, 4, 5
9.1	Analyze the safety, social, environmental, and legal aspects of engineering activity	1, 2, 3, 4, 5
9.2	Evaluate the uncertainties and risks associated with engineering activities	1, 2, 3, 4, 5
9.3	Anticipate the positive and negative impacts of introducing innovative technologies to solve engineering problems	1, 2, 3, 4, 5

## 5 Teaching and Learning Activities

### 5.1 Lecture

**Topics:** Background and methodology of engineering exposure risk assessments to human health and the environment.

**Topics:** Methodologies for risk communication and management.

**Topics:** Exposure and dose-response assessments (receptor impacts).

**Topics:** Fundamentals of statistics and probability.

**Topics:** Engineering risk strategies.

**Topics:** Databases and information sources.

**Topics:** Broader views of engineering risk implications (case studies, developing world considerations).

## 5.2 Note

Attendance is expected for all lectures.

Students are responsible for all information presented during lectures and tutorials. Student participation is highly encouraged. The dynamics of each learning activity should be based on professionalism and mutual respect. Everyone in the class has the right to participate and contribute. If there is anything that may prevent your full contribution, let the instructor know as soon as possible.

## 5.3 Other Important Dates

Please see the schedule of dates for other important dates in the academic year:  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c03/index.shtml>

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# 6 Assessments

## 6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Project	25
Quizzes	10
Midterm Exam	25
Final Exam	40

Name	Scheme A (%)
Total	100

## 6.2 Assessment Details

### Risk Assessment Project (25%)

**Learning Outcome:** 1, 2, 3, 4, 5

Electronic copies are to be submitted to Dropbox. The project will focus on modelling a risk or scenario of your choice using statistical software (R or MATLAB).

Interim Report (due Feb. 16th): 5%

Final Report (due March 31st): 20%

### Quizzes (10%)

**Date:** During scheduled tutorial periods (week 3 and 10)

**Learning Outcome:** 1, 2, 3

### Midterm Exam (25%)

**Date:** Thu, Feb 29

**Learning Outcome:** 1, 2

If you are unable to write the midterm, the weight will be transferred to the final exam.

### Final Exam (40%)

**Date:** Sat, Apr 20

**Learning Outcome:** 1, 2, 3, 5

## 7 Course Statements

### 7.1 Course Grading Policies

**Passing grade:** In order to pass the course, students must obtain a grade of 50% or higher.

**Missed midterm test:** If you miss the midterm exam due to grounds for granting academic consideration or religious accommodation, the weight of the midterm will be added to the final exam.

### 7.2 Relationships with other Courses & Labs

#### Previous Courses:

This course requires the student to have successfully completed a basic course in statistics

## 8 School of Engineering Statements

### 8.1 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 but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. 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 labs.

### 8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. 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.

### 8.3 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.

## 9 University Statements

### 9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### 9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

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

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions  
<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### 9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes  
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses  
<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

### 9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### 9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website  
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website



<https://www.ridgetownc.com/services/accessibilityservices.cfm>

## 9.6 Academic Integrity

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 encourages academic integrity. 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 or faculty advisor.

Undergraduate Calendar - Academic Misconduct

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

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## 9.7 Recording of Materials

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

## 9.8 Resources

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

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

## 9.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

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