



# TOX\*4000 Medical Toxicology

Fall 2022

Section(s): C01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 2.00 - August 31, 2022

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## 1 Course Details

### 1.1 Calendar Description

This course will focus on the toxicology of mammalian body systems with emphasis on dose-response, mechanisms and the sites of action of major groups of chemical toxicants and biological toxins. The course is designed for students majoring in Bio-Medical Sciences, Biomedical Toxicology and Toxicology.

**Pre-Requisites:**

BIOM\*3090

**Restrictions:**

This is a Priority Access Course. Enrolment may be restricted to particular programs or specializations. See department for more information.

### 1.2 Course Description

The goal of this course is to provide students with a detailed understanding of the effects that toxicants may have on mammalian body systems. The initial series of classes will focus on toxicological principles including toxicokinetics and cellular mechanisms of toxicity. The remainder of the semester will focus on the toxicology of major organ and non-organ systems, with a special focus on neurotoxicology. Detailed discussion of toxicological mechanisms and prototypical example toxicants will be explored. Information will be provided via lectures and student-led discussion of case studies. In addition students will have opportunities to participate in communication of toxicological findings and principles in the form of a popular media article and a multi-platform group capstone project.

### 1.3 Timetable

**Class Time:** Monday, Wednesday, Friday: 9:30 a.m. to 10:20 a.m.

### 1.4 Final Exam

There is no final exam for this course. Instead, there will be a group capstone project at the

end of the course. Classes will be held in person in THRN 1307.

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## 2 Instructional Support

**E-mail Policy:** We will strive to respond to emails within two business days.

### 2.1 Instructional Support Team

<b>Instructor:</b>	Karson Theriault PhD
<b>Email:</b>	theriauk@uoguelph.ca
<b>Office:</b>	OVC 2628
<b>Office Hours:</b>	Monday 11-12 pm

### 2.2 Teaching Assistants

<b>Teaching Assistant (GTA):</b>	Mackayla Nelson
<b>Email:</b>	mackayla@uoguelph.ca

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## 3 Learning Resources

### 3.1 Recommended Resources

**Casarett & Doull's Toxicology: The Basic Science of Poisons, 9th ed. (Textbook)**  
Some lecture material is taken from the textbook. Physical and electronic copies of the textbook are on reserve at the library.

### 3.2 Case Studies in Medical Toxicology

Download PDF from here: <https://link.springer.com/content/pdf/10.1007%2F978-3-319-56449-4.pdf>

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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

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

1. Read primary toxicological literature and understand it and distill it for a broader audience.
2. Understand basic and complex toxicological principles.

3. Discuss and resolve toxicological case studies.

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## 5 Teaching and Learning Activities

**Class Time:** Monday, Wednesday, Friday: 9:30 a.m. to 10:20 a.m.

**Class Location:** Albert A. Thornbrough Building (THRN), Room 1307

### Summary of Important Dates:

Sept. 9th (First class): Introduction and overview of class format; How to sign-up for group presentation dates

Oct 14th (Via dropbox by 11:59 p.m.): Press Release Assignment Due

Oct 24th (In class): Midterm examination

Nov 4th: 40th Class day

Dec 2nd (Via dropbox by 11:59 p.m.): Capstone Projects Due

### Below is the Class Schedule:

- **Class days for Case Studies are listed as such**
- **The last class is Friday, December 2nd**

### 5.1 Lecture

#### Fri, Sep 9

**Topics:** Introduction and Course Overview  
Instructor: Theriault

#### Mon, Sep 12

**Topics:** Toxicology Principles and Risk Assessment  
Instructor: Theriault

#### Wed, Sep 14

**Topics:** Toxicokinetics: ADME  
Instructor: Theriault

#### Fri, Sep 16

**Topics:** Biotransformation: Phase 1 Reactions  
Instructor: Theriault

#### Mon, Sep 19

**Topics:** Biotransformation: Phase 2 Reactions  
Instructor: Theriault

**Wed, Sep 21**

**Topics:** Toxicodynamics: Mechanisms of Toxicity  
Instructor: Theriault

**Fri, Sep 23**

**Topics:** How to Prepare a Press Release  
Instructor: Angela and Kristyn (UoG Library)

**Mon, Sep 26**

**Topics:** Neurotoxicology Part I  
Instructor: Theriault

**Wed, Sep 28**

**Topics:** Neurotoxicology Part II  
Instructor: Theriault

**Fri, Sep 30**

**Topics:** Neurotoxicology Part III  
Instructor: Theriault

**Mon, Oct 3**

**Topics:** Genetic Toxicology and Carcinogenesis Part I  
Instructor: Theriault

**Wed, Oct 5**

**Topics:** Genetic Toxicology and Carcinogenesis Part II  
Instructor: Theriault

**Fri, Oct 7**

**Topics:** Industry Guest Lecture  
Instructor: Rebecca Rogerson (Intertek)

**Mon, Oct 10**

**Topics:** Thanksgiving

**Wed, Oct 12**

**Topics:** Developmental Toxicology

Instructor: Dr. Craig Bailey

**Fri, Oct 14**

**Topics:** Developmental Toxicology

Instructor: Dr. Craig Bailey

**Mon, Oct 17**

**Topics:** Immune System Toxicology Part I

Instructor: Theriault

**Wed, Oct 19**

**Topics:** Immune System Toxicology Part II

Instructor: Theriault

**Fri, Oct 21**

**Topics:** Immunotoxicity and the Brain

Instructor: Theriault

**Mon, Oct 24**

**Topics:** Midterm Examination

**Wed, Oct 26**

**Topics:** Overview/Instructions on how to do Case Presentations

Group Working Time

**Fri, Oct 28**

**Topics:** How to Perform a Literature Search

Instructor: Theriault

**Mon, Oct 31**

**Topics:** Guest Lecture Presentation

Instructor: Dr. Kris Gies

**Wed, Nov 2**

**Topics:** Case Presentations Groups 1 and 2

**Fri, Nov 4**

**Topics:** Guest Lecture Presentation - VIRTUAL

Instructor: Maria Sanford

**Mon, Nov 7**

**Topics:** Case Presentations Groups 3 and 4

**Wed, Nov 9**

**Topics:** Case Presentations Groups 5 and 6

**Fri, Nov 11**

**Topics:** Case Presentations Groups 7 and 8

**Mon, Nov 14**

**Topics:** Case Presentations Groups 9 and 10

**Wed, Nov 16**

**Topics:** Case Presentations Groups 11 and 12

**Fri, Nov 18**

**Topics:** Case Presentations Groups 13 and 14

**Mon, Nov 21**

**Topics:** Case Presentations Groups 15 and 16

**Wed, Nov 23**

**Topics:** Case Presentations Groups 17 and 18

**Fri, Nov 25**

**Topics:** Case Presentations Groups 19 and 20

**Mon, Nov 28**

**Topics:** Case Presentations Groups 21 and 22

**Wed, Nov 30**

**Topics:** Case Presentations Groups 23 and 24

**Fri, Dec 2**

**Topics:** Capstone Project Showcase (Optional)

Instructor: Theriault

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## 6 Assessments

The final grade in this course will be determined by five main components:

### 6.1 Marking Schemes & Distributions

Grades in the course will be determined according to the following format:

15%	Case Study Presentation
15%	Quizzes on Case Study Group Presentations
15%	Press Release/Newspaper Article
25%	Midterm examination
30%	Capstone Project

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100% Final Grade

## 6.2 Assessment Details

### Press Release and Newspaper Article for a Published Research Article (15%)

**Due:** Fri, Oct 14, 11:59 PM

To improve science communication (#scicomm), students will pick an article and create a press release related to it exploring its impact on the lay public or policy, while maintaining scientific accuracy. Students will choose **one** published research article from those posted on CourseLink and **individually** prepare and submit a Press Release of that article. This report should be no longer than 4 double-spaced pages and is to be submitted electronically using Dropbox on the CourseLink website by 11:59 p.m. on Friday, October 14th.

Each Press Release article of a research article should be written in your own words and should ensure the following:

- Engaging Title as appropriate for press release
- Introduction / background of the issue
- Accurate summary of the findings without Hyperbole
- How these findings fit into the current understanding on the issue
- Your critique: Are the authors justified in making the conclusions that they are?

The penalty for submitting written evaluations after the deadline will be 10% per day deducted from the grade for this assignment. Figures and references may be included in this report, and do not count in the 4-page of maximum writing; these should be placed after your main text.



Great Resource: <https://www.sciencedirect.com/science/article/pii/S0161813X14000345>

### **Case Study Group Presentations (15%)**

Students will form groups of 3-4 people and deliver a Case Study presentation in class on their assigned topic and day. There will be two group presentation per assigned day. Presentations will review a case related to a diagnosis that will be assigned individually to the groups (without the other class members knowing of the topics). Presentations should be no longer than 15 minutes total, followed by 5 minutes of discussion involving the whole class. The format for the presentation is as follows:

- i. Description of the case report (History of Present Illness and Physical Examination)
- ii. Differential Diagnoses (provide a list) and ask the class for what the most likely diagnosis is?
- iii. Diagnostic Testing Results
- iv. Treatment Course
- v. Broader Discussion of Symptoms, Causes and Diagnosis.

You may insert figures/data from the primary case reports, or from other research articles, into your presentation. Each group will be evaluated for their ability to initiate and continue a discussion with the class at the end of the presentation.

Other notes for the presentations:

- Each group is responsible for either finding a published case study or creating a fictional one based on their research on the diagnosis. The presentation must be completed within 15 minutes and marks will be deducted if it is too short or too long by more than 2 minutes. The instructor will moderate timing for the discussions.
- The presentation slides should be made using Powerpoint. You may run your slides off of your own computer or from a USB drive plugged into the classroom computer.
- The division of labour will be decided among group members, however all group members must speak during the presentation.
- Prior to the presentation, each student will individually submit a completed

form indicating the percent of the total work completed by all group members. Each member of the group will receive the same grade, unless it is unanimous across all members that there were significant issues with the contribution of an individual member.

- Presentations will be evaluated for content, style, timing and teamwork, in addition to the effort made to foster good class discussion.

#### **Quizzes on Case Presentations (15%)**

There will be 3 quizzes worth 5% each on the content covered in the clinical case presentations. These quizzes will happen on CourseLink on November 11th, November 18th and November 25th. There will be 5 questions on each quiz.

#### **Midterm Examination (25%)**

**Date:** Mon, Oct 24

A midterm examination will be held in class on Friday, October 24. This examination will cover material presented in all lectures up to and including Wednesday, October 19.

#### **Capstone Project (30%)**

**Date:** Fri, Dec 2

Students will work in groups of 5-6 to produce 3 types of deliverables related to a topic of their choice. Group members and topics must be e-mailed to the instructor and approved by no later than Friday, October 14th at 5:00 p.m. The deliverables include the following:

1. Two infographics: one that presents common myths related to the topic and one that presents the toxicokinetics (ADME) of a toxicant/xenobiotic associated with the topic
2. A 10-page white paper outlining potential solutions or evidence-based strategies to combat the topic
3. A 8-10 minute video of a Fireside Chat/panel discussion between all group members that tackles different aspects of the topic

This will give students the opportunity to help create social change, especially in the context of current lack of evidence-based resources on these topics. Students are encouraged to join the groups that would complement their interests and skillset. The scientific integrity of these deliverables is most important. Each group will also submit a 1-page "Contributions" document outlining the contributions from each team member that will be signed and agreed upon by all members.

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## **7 Course Statements**

### **7.1 Turnitin**

In this course, your instructor will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

## **8 University Statements**

### **8.1 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.

### **8.2 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>

### **8.3 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>

## 8.4 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.

## 8.5 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>

## 8.6 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>

## **8.7 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.

## **8.8 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>

## **8.9 Disclaimer**

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

## **8.10 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).

## **8.11 Covid-19 Safety Protocols**

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

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