

Department of Computer and Mathematical Sciences, University of Toronto  
MATA35 – Calculus II for the Biological Sciences

Syllabus—Winter 2023  
January 01, 2023

**Instructor:** Yun William Yu

**Piazza:** <https://piazza.com/utoronto.ca/winter2023/mata35>

For general course questions that other students might also have, please use Piazza. If you directly email a general question, such as “When is the next quiz?” we will reply saying that you should be using Piazza instead.

**Course Email:** [MATA35-WINTER-2023-L@listserv.utoronto.ca](mailto:MATA35-WINTER-2023-L@listserv.utoronto.ca)

The course email forwards to the entire teaching team, including myself and all of your TAs. Please write your tutorial number in the start of the subject line in brackets (e.g. “[TUT0001]: problem with marking”), so that the email is routed to the correct TA. Emails *must* be from your utoronto.ca email account (this is a UofT policy), and should contain all necessary information, including your lecture section and tutorial section.

**Instructor Email:** [yw.yu@utoronto.ca](mailto:yw.yu@utoronto.ca) – use this email address ONLY if it is a matter that you prefer the other members of the teaching team not read. For example, if you have complaints about your TA, this is the email address to use. To minimize the chance I miss the email, make sure to include all of the above information, but also put MATA35 in the subject line (e.g. “[MATA35]: my TA doesn’t show up to tutorial”).

**Home page:** <https://courses.ywyu.net/MATA35-2023-Winter/>

**Quercus:** <https://q.utoronto.ca/courses/294477>

**Synchronous lectures:** Mondays, 8-10am and Thursdays, 8-9am in-person in AC 223. During the synchronous class times, I will lecture on the topic at hand. At various times during the lectures, I will require class-participation through polls. Participation by responding to questions in the polls is a required part of your final mark (see make-up options below).

**Tutorials/Quizzes:**

There are two purposes for your tutorials; some tutorials will be spent reviewing the material covered in class and the unmarked practice problems you have been assigned. On four of the tutorials (marked on the course calendar), however, there will be quizzes covering recent material. To ensure fairness, I will always write a practice quiz in the same format I publish in advance. Every tutorial will receive a different copy of a quiz, but there will be no advantage for a later tutorial knowing the content of an earlier quiz, because the format will be the same as the practice quiz.

**Office hours:**

- Yun William Yu (IC 343): Thursdays, 9-10am (after class)

**Overview**

This is a lower-level course introducing mathematical techniques that will be useful for majors/specialists in biology and allied disciplines, and how to apply those techniques for

biological problems. The prerequisite for this class is MATA29 (Calculus I for the Life Sciences); you are expected to have a solid grounding in basic algebra, transcendental functions, limits, and differential calculus, as well as exposure to antiderivatives and integral calculus. This course will cover multiple integration, linear algebra, regression analysis, differential equations, biological modelling, power series, and linearization of nonlinear systems. Unlike other courses covering similar material (MATA22-23, MATB44, MATC58), we will focus on applying techniques rather than understanding the underlying rigorous theory.

## Requirements

Students should have an internet-connected device in-class to allow for participation in the in-class polls.

## Learning Outcomes

1. **Mathematical techniques**  
You will learn a variety of mathematical techniques.
2. **Applying math to biology**  
You will learn how to apply those mathematical techniques to biological problems.

## Textbooks

- Required: *Calculus for the Life Sciences* by Marvin Bittinger, Neal Brand, and John Quintanilla. 1<sup>st</sup> Edition. ISBN: 0321279352. ISBN-13: 9780321279354.
- I will also be posting all of my lecture notes on the class website.

## Lectures, Notes, and Recordings

Lectures will include in-class polling by making use of a chat/polling website I wrote. Your participation in chat is required, and will form a part of your overall mark.

The class is slated to be WebOption'd. Because it is through WebOption, I have no control over when the videos are made available.

## Evaluation and Grades

- *40%: Three hour final exam during final exam period*  
**Date:** To be determined.  
The final exam will be cumulative, but will focus on the material covered in the second half of the class (after the midterm). It will be conducted in-person. You may not use any outside resources. No calculator or cheat sheet is permitted.
- *50%: Quizzes*  
There will be 5 quizzes, including 4 in-class quizzes, and 1 take-home quiz. The in-class quizzes will take place during tutorials on the specified weeks.  
The take-home quiz (which will be the third of the five quizzes), will take place during a 24-hour period. The take-home quiz will be open-book, and you will be allowed to use calculators and data analysis software as specified in the quiz instructions (e.g. a Python notebook). However, you may NOT collaborate with your classmates, tutors, or any third party. Additionally, you may not post any of the questions to online forums, message boards, etc. for help. For example, you may NOT post to Chegg, Stackexchange, etc. All of the work must be your own, and you must show all intermediate work.  
If you do better on the final exam than on your worst quiz mark, I will

automatically replace your worst quiz mark with the mark you received on the final. Note that this includes the scenario where you missed a quiz and got a 0 for that. Thus, you may effectively miss a single quiz without penalty (the weight will simply be shifted to the final). This replacement is only for a single quiz, however.

You generally must take your quizzes during the tutorial you are registered for. Should you have a documented reason for being unable to attend one of the quizzes, please contact the instruction team by email. We may be able to on a case-by-case basis allow you to take the quiz with another tutorial. If at all possible, please contact us as soon as you are aware of a problem, and we will try to be accommodating. Otherwise, you will have to take a 0 for that quiz (though if it's your only 0, you may replace it with your final exam mark).

- *10%: Class polls / chat participation.*

I expect you to pay attention during the lectures (and apologize greatly for the 8am scheduling, which was beyond my control), and participation in the chat/responses forms part of your mark. There will regularly be polls, and you must reply to at least half of the polls each week in order to get any credit. To facilitate marking, please use the following format for your name on the chat website: "UTORID\_common name". For example, I would be "yuyun2\_William" or "yuyun2\_ProfYu".

If you have to miss a class, you may make up for it by sending a 2-page written report on the content you missed to the course email: [MATA35-WINTER-2023-L@listserv.utoronto.ca](mailto:MATA35-WINTER-2023-L@listserv.utoronto.ca). i.e. You should watch the lecture on WebOption, and then write a report, summarizing the material in your own words and specifying what *you* found most interesting or surprising. All reports should be at least one *full* page, and I expect most to be about 1.5 pages long. You may include diagrams you draw yourself where it makes sense to.

Participation on the Piazza is not required, but encouraged. If you are a frequent Piazza participant (especially as an answerer, but including as an asker), I may give a bonus mark, though you should not count on this—the last time I taught this course, I think only 1-2 students got a bonus mark.

- *0%: Suggested problems and practice quizzes.*

I may assign suggested problems or give out practice quizzes. These are unmarked, but may be discussed during tutorial. I strongly suggest you practice using them because the problems on the quizzes will be similar in scope and content.

### **Late policy / extension penalty**

I will not accept late quizzes, unless you inform us of problems as soon as they occur *before* the deadline. Should you have a documented reason for being unable to attend your assigned tutorial on a quiz day, we may be able to on a case-by-case basis allow you to take the quiz with a different (earlier or later) tutorial, but you must email us as soon as possible.

### **Piazza**

If you have a question, chances are someone else in your class does too! As such, for general questions, we prefer that you communicate through the class forums online. Sometimes, other students will be able to answer your question. The teaching staff will also regularly check the online forums, and this will ensure that your classmates can also read the answer.

Piazza: <https://piazza.com/utoronto.ca/winter2023/mata35>

## **Quercus Info**

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. Once you have logged in to Quercus using your UTORid and password, you should see the link or "card" for MATA35H3. You may need to scroll through other cards to find this. Click on the MATA35H3 link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides for students that you can access by clicking on the "?" icon in the left side column. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

## **Accessibility Statement**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services as soon as possible.

Accessibility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. You can reach them by phone at 416-287-7560 or email [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca). The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.

## **Specific Medical Circumstances**

If you become ill and it affects your ability to do your academic work, consult the course instructor right away. Normally, you will be asked for medical documentation in support of your specific medical circumstances. The University's Verification of Student Illness or Injury (VOI) form is recommended because it indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. You can submit a different form (like a letter from the doctor), as long as it is an original document, and it contains the same information as the VOI. For more information, please see <http://www.illnessverification.utoronto.ca/>

If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible. A student registered with the AS isn't usually asked to provide a VOI because registration with AS already requires students to provide health-related documentation.

(pg.23 <http://www.vicereprovoststudents.utoronto.ca/Assets/Students+Digital+Assets/Demystifying+Academic+Accommodations.pdf> )

## **Religious Accommodation**

The University has a commitment concerning accommodation for religious observances. I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. According to University Policy, if you anticipate being absent from class or missing a major course activity (like a test, or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

### **Academic Integrity**

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm> ) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment. On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

### **Privacy/FIPPA Statement**

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971, and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to [www.utoronto.ca/privacy](http://www.utoronto.ca/privacy).

### **Harassment/Discrimination**

The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.