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

Syllabus—Summer 2021
June 21, 2021

Instructor: Yun William Yu

Email: yw.yu@utoronto.ca
For general course questions that other students might also have, please use Piazza.

For specific questions pertaining only to you, you should email me. When you email me, please write "[MATA35]" in the start of the subject line, to minimize the chance I miss your message. 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.

Home page: http://www.math.toronto.edu/ywyu/MATA35-2021-Summer/

Quercus: https://q.utoronto.ca/courses/218246

Piazza: http://piazza.com/utoronto.ca/summer2021/mata35

Synchronous lectures: Wednesdays, 12-2pm and Fridays, 12-1pm on Zoom. Link will be provided via Quercus. 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 the chat functionality. Participation by responding to questions in the chat is a required part of your final mark.

Tutorials/Quizzes:

- TUT0001: Thursday, 3-4pm, Bo Chen
- TUT0002: Wednesday, 3-4pm, Ali Pirhosseinloo

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 five of the tutorials (marked on the course calendar), however, there will be quizzes covering recent material. To ensure fairness, I will always write at least three similar but distinct quizzes. One of them will be a practice quiz I publish in advance. The other two will be the quizzes for each of the tutorials. i.e. the two tutorials will not receive the same quiz, but there will be no advantage for the Thursday tutorial knowing the content of the Wednesday quiz, because the format will be the same as the practice quiz.

Office hours: (on the same Zoom link as lectures)

- Yun William Yu: Fridays, 1-2pm
- Bo Chen: Thursdays, 4-5pm
- Ali Pirhosseinloo: Tuesdays, 2-3pm

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 an 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 must have desktop/laptop, working microphone, access to reliable internet, a webcam, and the ability to draw diagrams/write math by hand (either through a scanner, camera, or tablet).

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. 1st 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 the chat functionality in Zoom. Your participation in chat is required, and will form a part of your overall mark.

After class, I will be posting my lecture notes to the class website and a recording of the lecture to YouTube. The recording will only be of my video feed, and will not include your video/audio/chat. Thus, even if you turn on your video/audio (which I encourage), you do not need to worry about it being recorded.

However, for the final exam and in-tutorial quizzes, you will be required to have your webcam on. The exam and quizzes will be recorded for internal use; they will not be posted anywhere.

Evaluation and Grades

- *40%: Two 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 live and invigilated via webcam on Zoom, and submitted via Crowdmark. You may choose to either (1) write your answers on a sheet of paper and scan/upload them or (2) write your answers on a tablet and upload a PDF. You may not use any outside resources and may not search on the internet. There will be 15 minutes after the exam for scanning/uploading. If you have technical difficulties, you must inform me *before* the deadline.
- *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. These quizzes will be 40 minutes long, and there will be extra time to scan/upload afterwards. Most of the quizzes will be via Crowdmark and Zoom, like the final, though the delivery method may change for some quizzes (e.g. some may be using Quercus quizzes or WebWork). You must have your webcam on during the quizzes, angled to show both your writing surface and yourself; you may not use any outside resources during the quizzes unless explicitly told otherwise.

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 miss a single quiz effectively without penalty (the weight will simply be shifted to the final). This replacement is only for a single quiz, however.

Other than the take-home quiz, you 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 instructor by email. In exceptional circumstances (such as with an officially documented excuse), the instruction team may at our discretion offer you the ability to take the quiz with the other tutorial. Otherwise, you will have to take a 0 for that quiz.

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

  I expect you to pay attention during the livestreamed lectures, 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 in order to get any credit.

  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 few bonus marks (+1-2% max).

- *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 exams or quizzes, unless you inform us of technical problems as soon as they occur *before* the deadline. If you have technical problems, I or the proctoring TA will remain on the Zoom to help you troubleshoot, and we will accept your work immediately after resolution of the problem.

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: http://piazza.com/utoronto.ca/summer2021/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 Access*Abillity* 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. 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.viceprovoststudents.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.

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.