Concordia Faculty of Arts and Science
SFYX-Math 203 Fall 2020

Instructor &TA contact information

Instructor: Dr. Georgeana Bobos-Kristof   g.bobos@concordia.ca

Teaching assistant: Dalia El-Farawi   dalia.el-farawi@mail.concordia.ca

Office hours: Zoom-based, by appointment

Preface:

Due to exceptional circumstances, this course will be taught, and all assessments will be done completely ONLINE. Given the subject matter and nature of this course, the midterm and the final exams will be given online through the Concordia Online Exams (COLE) platform with online proctoring. For more details see the ADDENDUM at the end of this Course Outline.

Schedule:

Lecture: Tuesday, 17:45 to 20:15

Tutorials: Monday, 13:15 to 14:30
                         Monday, 14:45 to 16:00
                         Monday, 16:15 to 17:30

Course description and outline:

- This is the First-year Science Experiment (SFYX) Special Version of Calculus Math 203
- SFYX Math 203-53 is academically equivalent to Math 203 as offered by the Department of Mathematics and Statistics and meets all of the curricular objectives of the regular version of Math 203. ***However, this version of the course is enriched with the application of calculus concepts in science and elsewhere: it will function as an enrichment to the students' scientific toolboxes. The interdisciplinary aspect of the course is reflected in lectures, Mathematica-enhanced tutorials, readings, and assessment.***
- The course is open to 2020 SFYX science students and regular Concordia undergraduate students fulfilling the admission requirements for Math 203, offered by the Department of Mathematics and Statistics. The enrollment capacity of this course is set by the Faculty of Arts and Science. Since this course is a mathematics component of the SFYX initiative. Non-SFYX students may take this course provided that space is available.

- The enrollment capacity of the tutorials is 30 students per tutorial. All three weekly tutorials cover identical content. All tutorials are interactive and require student laptops. Enrollment in the tutorials is first-come-first served, and students can choose the tutorial that suits their agenda if space is available. All students must complete one tutorial per week if a tutorial is given.

Textbook and MyLab Math:

Thomas' Calculus: Early Transcendentals, Single Variable, (ed. 14) Books a la Carte edition plus MyLab Math, (Pearson). Options with or without the loose-leaf text (E-book only, including in MyLabMath) can be ordered. The digital and print versions of the textbook will be available at: https://www.bkstr.com/concordiastore/home
Note: Students should order print copies of the textbook as early as possible, in case books are backordered or there are any shipping delays.

Grading scheme:

(see below for details)
1. Reflections: 10%
2. WeBWorK assignments: 10%
3. Midterm test: 20%
4. Final examination: 50%
5. Final project: 10%

Reflections

There will be 8 to 10 reflections written spontaneously, during the scheduled class time, each answering the following two questions:
- *Summarize in words what you have learned from today's lecture and from your participation in the class.*
- *Summarize in words how what you have learned today fits into your previous knowledge or how you think you might be able to use it in the future.*

These reflections will function as journal entries for students' engagement in the course: they will be an essential resource for understanding and retaining the material, and a great prompt for further exploration.

WeBWorK assignments

Students will be given access to an online system called WeBWorK: they are expected to submit assignments online using this system. Late assignments will not be accepted.
Assignments not only contribute to students' grade – they are an essential tool for practice every week. In addition to the graded assignments, extra practice is posted on WeBWorK before the midterm and the final exam.

Midterm Test

There will be one midterm test, based on the material of weeks 1-6. The test will be common for all sections of this course and will be held on Sunday October 25, 2020, at 3:00 P.M.

Students who will not be able to write the test that day for a valid reason, e.g. religious (to be reported to the section's instructor in advance) or illness (a valid medical note required), may write an alternate midterm test on Saturday October 31, 2020, at 10:00 A.M. It is the Department's policy that tests missed for any reason, including illness, cannot be made up. If you miss both the main and the alternate midterm tests for a valid reason supported by appropriate documentation, the weight of the midterm test is transferred to your final exam (i.e, the final exam will be worth 70%). Travel arrangements are not considered a valid reason for missing the midterm test.

Final Exam
The final examination will be online two hours long and will cover all the material in the course. NOTE: Students are responsible for finding out the date and time of the final exams once the schedule is posted by the Examinations Office. Conflicts or problems with the scheduling of the final exam must be reported directly to the Examinations Office, not to your instructor.

Project
Students will produce a project on a topic of their interest inspired by what sparked their curiosity during lectures, tutorials or even their independent explorations of calculus applications to science. They are encouraged to use technology (the Mathematica software) for both the exploration and the exposition of their findings, in order to focus on concepts and understanding versus rote calculations. More details and support will be provided throughout the semester. Also, the reflections completed every week will serve as a source of inspiration.

Course content:

Note:
1. The topics will be explored with an emphasis on a broader interdisciplinary science approach: calculus applications to science will be an essential component of each lecture.
2. All of Chapter 1 is a review of material that is covered in prerequisite courses and is important for this course. The material that is skipped in this review will be introduced briefly later in the course when needed. If you don't know this preliminary material thoroughly, it is particularly important that you learn it through the assignment questions and recommended problems.

Week 1
Review of functions I
1.1 Representations of Functions
1.2 Combining Functions; Shifting & Scaling Graphs
1.3 Trigonometric Functions

Week 2
Review of functions II
1.5 Exponential Functions
1.6 Inverse Functions and Logarithms

Week 3
2.1 Rates of change and Tangent Lines
2.2 Limit of a Function and Limit Laws
2.4 One-Sided Limits
2.6 Limits Involving Infinity; Asymptotes

Week 4
2.5 Continuity
3.1 Tangent Lines and the Derivatives
3.2 The Derivative as a Function

Week 5
3.3 Differentiation rules
3.4 The Derivative as a Rate of Change

Week 6
3.5 Derivatives of Trigonometric Functions
3.6 The Chain Rule

Week 7

3.7 Implicit differentiation
3.8 Derivatives of Inverse Functions and Logs

Week 8

3.9 Inverse Trigonometric Functions
3.10 Related rates

Week 9

3.11 Linearization and Differentials
4.1 Extreme Values of Functions on Intervals

Week 10

4.2 Mean Value Theorem
4.5 Indeterminate forms and L'Hôpital's Rule

Week 11

4.3 Monotonic Functions
4.4 Concavity and Curve Sketching

Week 12

4.6 Applied Optimization

Week 13

Review

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity."

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities.

Disclaimer: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in the course is subject to change.

Addendum:

This course will be taught and all assessments will be completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring). More information about the COLE system may be found at the COLE website.

Please note the following respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That your image, voice and screen activity will be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very **strongly recommended** to enter the virtual test site found at the COLE website and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is September 21, 2020. Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsdinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. Visit the COLE website for more information.