

**MAST 218**  
Multivariable Calculus I  
*Fall 2021*

Instructor\*: \_\_\_\_\_

Office/Tel No.: \_\_\_\_\_

Office Hours: \_\_\_\_\_

\*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

**Preface:** This course consists of two sections. Unless further university directives, one section will be blended/in person, but mostly remote via the Zoom platform and one section will take place remotely via the Zoom platform entirely. Course notes and any other material considered relevant by the course instructor, including course announcements and Zoom links, will be posted on Moodle.

**Office Hours:** The instructor will announce in class the hours when help will be available to discuss and clarify the material of the course. Office hours may be held on Zoom. Note that, if a student misses a lecture, the instructor will not use office hours to make up for the student's missed class. Office hours are to clarify and better assimilate the material of the course that the student tried first to understand from the lecture or textbook in an individual study.

**Prerequisites:** Math 204 and 205 or equivalent.

**Textbook:** *Multivariable Calculus*, 9th Edition by J. Stewart, (Cengage Learning, © 2020) ISBN: 9780357042922 (hardcover) and 9780357746943 (ebook) available at the university's bookstore <https://www.bkstr.com/concordiastore/home>. The 8th Edition is not available for purchase, but you may use it for this course if you already have it. The course outline has the weekly sections and suggested problems for both editions (see tables on pages 2-3).

**WeBWork:** Every student will be given access to an online system called **WeBWork**. Students will use this system to do online assignments (see Assignments below).

**Assignments:** Assignments are *very important* as they indicate the level of difficulty of the problems that students are expected to solve and understand. Therefore, every effort should be made to do and understand them. Students are expected to submit assignments online using **WeBWork**. Late assignments will not be accepted. Assignments contribute 10% to the final grade. The lowest grade assignment will be dropped (this could be an assignment marked as zero for not being submitted being submitted due to illness or late enrollment). Students are also strongly advised to work on the suggested problems, and similar ones, in the tables on pages 2-4.

**Web Resources:** Stewart Calculus offers a number of resources that you may use at the site [https://www.stewartcalculus.com/media/11\\_home.php](https://www.stewartcalculus.com/media/11_home.php)

**Use of Software** It is optional but strongly recommended to use software such as Maple, Mathematica or WolframAlpha to verify and illustrate the analytical results you get while solving your assignment problems.

**Calculators:** Only calculators approved by the Department are permitted in the midterm test and final examination. The preferred calculators are the **SHARP EL-531** and the **CASIO FX-300MS**. A list of approved calculators can be found at <https://www.concordia.ca/artsci/math-stats/services.html#calculators>.

**Tests:** One class midterm test covering the first five weeks will be given in week 6. **There is no make up for a missed midterm.** The final examination will cover material from the entire course. **All examinations, midterm and final, will be given online through the Concordia Online Exams (COLE) platform with online proctoring. For more details read the ADDENDUM at the end of this course outline.**

**Final Grade:** **35% midterm, 10% assignments, and 55% final exam.**

Students missing the midterm for a legitimate reason must inform their instructor in within 24 hours, and submit appropriate documentation within 1 week, to have the weight of the midterm transferred to the final exam and, thus, have the final grade calculated as follows: 10% assignments and 90% final exam.

**Scheduling and assignments for the 8th edition:**

Week	Sections	Topics	Suggested problems
1	10.1	Parametric equations of curves	10.1: 8, 17, 24
	10.2	Calculus with parametric curves	10.2: 6, 16, 32, 42
2	10.3	Polar coordinates	10.3: 20, 28, 32
	10.4	Areas and lengths in polar coordinates	10.4: 12, 26, 30, 48
	10.5	Conic sections	10.5: 8, 30, 44
3	10.6	Conic sections in polar coordinates.	10.6: 10, 12, 14
	12.1	Three-dimensional coordinate systems	12.1: 20, 23, 38
4	12.2	Vectors	12.2: 20, 26, 28
	12.3	Dot product	12.3: 22, 24, 42, 47
	12.4	Cross product	12.4: 4, 18, 44
5	12.5	Equations of lines and planes	12.5: 10, 20, 22, 34, 38, 74
	12.6	Cylinders and quadric surfaces	12.6: 12, 14, 18
6		<b>Review</b> <b>Midterm Evaluation</b>	
7	13.1	Vector functions and space curves	13.1: 32, 42, 50
	13.2	Derivatives and integrals of vector functions	13.2: 24, 26, 36
8	13.3	Arc length and curvature of space curve	13.3: 4, 6, 24, 30
	13.4	Velocity and acceleration	13.4: 18 (a), 23, 24
9	14.1	Functions of several variables	14.1: 18, 30, 48
	14.2	Limits and continuity	14.2: 12, 14, 38
10	14.3	Partial derivatives	14.3: 50, 68, 76 (d)
	14.4	Tangent planes and linear approximation	14.4: 6, 16, 26.
11	14.5	Chain rule	14.5: 8, 12, 34, 46
	14.6	Directional derivatives and gradient vector	14.6: 6, 32, 46.
12	14.7	Maximum and minimum values	14.7: 20, 32, 36, 52
13	14.8	Lagrange multipliers	14.8: 1, 4, 6, 16, 18
		<b>Review</b>	

**Scheduling and assignments for the 9th edition:**

Week	Sections	Topics	Suggested problems
1	10.1	Parametric equations of curves	10.1: 10, 22, 30
	10.2	Calculus with parametric curves	10.2: 10, 14, 35, 48
2	10.3	Polar coordinates	10.3: 20, 28, 36
	10.4	Areas and lengths in polar coordinates	10.4: 11, 26, 30, 52
	10.5	Conic sections	10.5: 8, 32, 46
3	10.6	Conic sections in polar coordinates.	10.6: 16, 18, 20
	12.1	Three-dimensional coordinate systems	12.1: 22, 25, 42

4	12.2 12.3 12.4	Vectors Dot product Cross product	12.2: 20, 26, 28 12.3: 22, 24, 42, 47 12.4: 4, 18, 44
5	12.5 12.6	Equations of lines and planes Cylinders and quadric surfaces	12.5: 10, 20, 22, 34, 38, 74 12.6: 14, 16, 20
6		<b>Review</b> <b>Midterm Evaluation</b>	
7	13.1 13.2	Vector functions and space curves Derivatives and integrals of vector functions	13.1: 40, 50, 58 13.2: 26, 28, 38
8	13.3 13.4	Arc length and curvature of space curve Velocity and acceleration	13.3: 6, 8, 28, 34 13.4: 18 (a), 23, 24
9	14.1 14.2	Functions of several variables Limits and continuity	14.1: 12, 30, 48 14.2: 12, 24, 50
10	14.3 14.4	Partial derivatives Tangent planes and linear approximation	14.3: 44, 62, 78 (d) 14.4: 10, 22, 34.
11	14.5 14.6	Chain rule Directional derivatives and gradient vector	14.5: 12, 16, 38, 50 14.6: 6, 38, 52
12	14.7	Maximum and minimum values	14.7: 22, 34, 38, 54
13	14.8	Lagrange multipliers <b>Review</b>	14.8: 1, 3, 6, 24, 30

**Final Note:** Active participation in classes and continuous work on the course material throughout the term is important for success in this course. Read the course material, practice as many problems as you can, and do the assignments on your own. By assuming a responsible behaviour (see also the **Academic Integrity and the Academic Code of Conduct** below), you will also achieve a better understanding of the material.

#### **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](http://concordia.ca/students/academic-integrity)." [Undergraduate Calendar, Sec 17.10.2]

#### **Behaviour**

All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the [Code of Rights and Responsibilities](#) which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

#### **Intellectual Property**

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](#). As specified in the [Policy on Intellectual Property](#), the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

#### **Extraordinary circumstances**

In the event of extraordinary circumstances and pursuant to the [Academic Regulations](#) the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the 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. More information about the COLE system may be found at the [COLE website](#). Additionally, an online proctoring tool called Proctorio will be used to provide proctoring during the exam. This type of proctoring is known as auto-proctoring, as there is no invigilation during the exam. Instead, your professor will review the recording after the exam.

Please note the following with 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 Proctorio is used to help uphold academic integrity. Proctorio's Terms of Service may be reviewed at <https://proctorio.com/terms>. Recordings made and information collected during the exam may be used for this purpose, in accordance with the Academic Code of Conduct.
- Recordings made during the exam may be used for this purpose, in accordance with the Academic Code of Conduct.
- That your image, voice and screen activity, including IP address, may be recorded throughout the duration of the exam.
- That you are required to turn on your webcam and it must be pointed toward your face and workspace at all times during the exam, failing which your exam may be deemed invalid.
- 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 and personnel authorized pursuant to University policies (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 may also be used to allow you to focus for the duration of the exam. Noise cancelling headphones are not allowed.

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 20, 2021**.

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 ([acsinfo@concordia.ca](mailto:acsinfo@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.