International College of Manitoba
University of Manitoba, Fort Garry Campus
508 University Centre, Winnipeg, MB, R3T 5Z3

Program: **UTP Stage 2 Science**

Course: **MATH1500 - Introduction to Calculus**

Instructor: Dr. Hamidreza Farhadi

Class Hours: Class Section 9 – Wednesdays **5:45pm – 9:45pm** in room **322 St Paul's College**.

Laboratory Hours: As scheduled.

Office Hours: Wednesdays **4 – 5:30pm** in Room 235 St. Paul's College .

E-mail: farhadi@umanitoba.ca or through the portal. (Emails not sent from an ICM nor umanitoba account will receive no response). When sending email to me, please specify that you are from the Math 1500 class.

1. Course Description

The main goals of this course will be to develop and practice the basic methods of computing the properties of functions of one variable together with their derivatives and integrals. In other words, functions of one variable and their local and global behavior based on local data are in the focus of our studies.

The course will present an introduction to *differential calculus*. The notion of the instantaneous rate of change of a variable is formalized in the concept of the derivative of a function. Typical applications to the physical world include velocity, acceleration, rate of growth of populations, and more.

The course will present an introduction to *integral calculus*. This is the inverse to differential calculus. In integral calculus you will learn how to compute various areas and how to reconstruct a function out of its initial data and derivative.

These two aspects of calculus together with their interplay are a part of the standard curriculum, with profound applications in the contemporary technological world.

2. Required Textbooks and Materials

James Stewart, Single Variable Calculus, Early Transcendentals, 7th Edition, Brooks/ Cole Publishing Company, 2012

Note: There are 2 versions of this text. One covers only chapters 1 to 5 and that is sufficient for MATH 1500. If you intend to go on to study MATH 1700, then buy the longer version.

3. Tentative Schedule of Topics

Week	Chapter, Section	Title	Lecture content (page numbers)	Suggested homework (odd numbers)
1	1.1 1.3 1.5	Four Ways to Represent a Function New Functions from Old Functions Exponential Functions	9 – 22 36 – 44 51 – 58	1-15, 22-64,69-70, 1-4, 28-46, 57 1-6,11-16,19-20
2	2.2 2.3	Limit of a Function Limit Laws	86 – 98 99 – 108	1-12, 15-18, 29-37 1-32, 37-46, 49
3	2.5 2.6	Continuity Limits at Infinity: Horizontal Asymptotes	118 – 130 130 – 143	1-8, 12-31, 41-43, 51-54 1-10, 15-38, 41-46, 52-56, 60
4	2.7 2.8	Derivatives & Rates of Change The Derivative as a Function	143 – 153 154 – 165	5-8, 12-15, 17, 33-40 1-11, 16-18, 21-31, 43-46
5	3.1 3.2	Derivatives of Polynomials & Exponential Functions Product & Quotient Rules	174 – 183 184 – 191	1-36, 47, 51-55, 60-63 1-34, 41-48
6	3.3 3.4	Derivatives of Trigonometric Functions Chain Rule	191 – 198 198 – 208	1-24, 31-34, 39-50 1-54, 61-64, 77-79
7	3.5 3.9	Implicit Differentiation (omit inverse trigonometric functions) Related Rates	209 – 217 244 – 250	1-32 1- 31
8	1.6 3.6	Inverse Functions & Logarithmic Functions Derivatives of Logarithmic Functions	58 – 71 218 – 223	1-18, 35-41, 49-58 1-34, 39-54
9	4.1 4.2	Maximum & Minimum Values Mean Value Theorem	274 – 282 284 – 289	1-44, 47-61 9-12, 19-21
10	4.3 4.5	How Derivatives Affect the Shape of a Graph Curve Sketching (omit oblique asymptotes)	290 – 301 310 – 318	1-29, 31-51 1-40, 42-53
11	4.7	Optimization Problems	325 – 337	1-21, 23-40
12	4.9 5.4 5.1	Anti-derivatives Indefinite Integrals Areas and Distances.	344 – 350 397 – 404 360 – 371	1-17,20-22, 25-43, 45-52, 59-65 1-35, 49-50 1-5
13	5.2 5.3	Definite Integral Fundamental Theorem of Calculus	371 – 385 386 – 397	1-3, 33-40, 51 1-48, 55-63

4. Voluntary Withdrawal Deadline

Sept 30, 2016 (with no financial penalty)
Nov 18, 2016 (with no academic penalty)

5. Marks and Evaluation Scheme

Evaluation Category	Date	Location	Weight
Eight Quizzes	See section 8	In the lab	10%
Intermediate Test #1	Oct 7	TBA	20%
Intermediate Test #2	Nov 4	TBA	20%
Final Examination	TBA	TBA	50%

NOTES:

- Tests will be written on the following dates: Test #1 on **Friday, October 7th from 6:00 PM - 7:00 PM**; Test #2 on **Friday, November 4th from 6:00 PM – 7:00 PM** Reminders will be given in class and on the portal.

- There will be 8 laboratory quizzes in total. Each quiz is written during your laboratory period. Your laboratory quiz grade will be calculated from your **best six scores from the eight quizzes**. See Section 11 for quiz dates and coverage.

- See Section 11 for course dates, course coverage, lab dates and lab coverage.

- The date and place of the Final Examination will be confirmed during the last week of classes.

- **IMPORTANT NOTICE:** Calculators or other electronic or mechanical aids, textbooks, notes, cell phones and pagers are not allowed during the quizzes, the intermediate tests or the final examination.

6. Required Proofs

Proof	Section
differentiable → continuous	2.8
$(cf)' = cf'$	3.1
$(f+g)' = f' + g'$	3.1
$(fg)' = f'g + g'f$	3.2
$(\sin x)' = \cos x$	3.3
$f' = 0$ on I → f is constant on I	4.2
$f' > 0$ on I → f is increasing on I	4.3
$f' < 0$ on I → f is decreasing on I	4.3

7. Letter Grades

Grade	Definition
A+ (4.5)	Exceptional achievement
A (4.0)	Excellent achievement
B+ (3.5)	Very Good achievement
B (3.0)	Good achievement
C+ (2.5)	Satisfactory achievement
C (2.0)	Adequate achievement
D (1.0)	Marginal achievement
F (0.0)	Failure

8. Student Accessibility Services

ICM and the University of Manitoba are committed to providing all students equal access to learning opportunities. "This means that our classroom, our virtual spaces, our practices, and our interactions should be as inclusive as possible. Mutual respect, civility, and the ability to listen and observe others carefully are crucial to universal learning." Student Accessibility Services (SAS) is the office that works with students who have permanent, chronic, or temporary disabilities to provide and/or arrange reasonable accommodations.

- **Students who have, or think they may have, a disability (e.g. mental health, attentional, learning, vision, hearing, physical, medical or temporary), are invited to contact Student Accessibility Services to arrange a confidential discussion at (204) 474-7423 (V), (204) 474- 9790 (TTY) or student_accessibility@umanitoba.ca.**
- **Students registered with Student Accessibility Services and who have a letter requesting accommodations are encouraged to contact the instructor early in the semester to discuss the accommodations outlined in their letter. Additional information is available at the Student Accessibility Services website: www.umanitoba.ca/student/saa/accessibility/**

9. Expectations

Students can expect a class format consisting of a lecture period, a break/work period, a further lecture period and a final break/work period. Worksheets will be provided. Lab periods will generally consist of a brief quiz (10 minutes or so) followed by a series of lab exercises. There are no make-up tests or quizzes.

Students are expected to attend each class and lab period regularly; to arrive in class and in the lab on time; to work diligently on the worksheets during the class work period; to avoid texting, twittering, tweeting, using Facebook and/or any other electronic communication during class; to do promptly the suggested homework from the text; and to complete the lab exercises. In the event of a missed test students must provide a medical note to the ICM office in which case the marks for the term test will be moved to the final exam.

10. Academic Integrity, Policy on Plagiarism and Cheating

Academic Integrity refers the values on which good academic work must be founded: honesty, trust, fairness, respect and responsibility. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the College community and compromise the worth of work completed by others.

Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.

International College of Manitoba regards acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offenses and may assess a variety of penalties depending on the nature of the offense.

Students found to have breached the regulations related to any form of academic misconduct including but not limited to examination personation, plagiarism and cheating will be subject to the following measures:

- First Offense: Awarded "0" for the assessment and given a permanent record on their file.
- Second Offense: Awarded "0" for the course, regardless whether the offense was committed in the same course or another course.
- Third Offense: Risk expulsion from ICM and the cancellation of Study Permit.

It is solely the student's responsibility to be aware of Academic Integrity Policy and consequences of violating it. The policy is available in the Student Academic Handbook, accessible on Student Portal.

International College of Manitoba condemns all forms of cheating.

11. Schedule of Course/Laboratories/Quizzes - FALL 2016

Week	Date	Sections in Class	Quiz	Lab Date	Section Covered in Quiz	Section Covered in Lab
1	Sept 5 - 9	1.1, 1.3, 1.5	Sept 9. No Lab. Complete the tutorial work sheet (1.1,1.3,1.5) on Moodle.			
2	Sept 12 - 16*	2.2, 2.3	**Q1**	Sept 16. 1st Lab.	1.1, 1.3, 1.5	1.1, 1.3, 1.5
3	Sept 19 - 23	2.5, 2.6	**Q2**	Sept 23	2.2, 2.3	2.2, 2.3
4	Sept 26 - 30	2.7, 2.8	**Q3**	Sept 30	2.5, 2.6	2.5, 2.6
5	Oct 3 - 7	3.1, 3.2	No Quiz.	Oct 7	n/a	2.7, 2.8
Test 1 Friday, October 7, 2016 6:00 PM - 7:00 PM						
6	Oct 10 - 14*	3.3, 3.4	**Q4**	Oct 14	3.1, 3.2	3.1, 3.2
7	Oct 17 - 21	3.5, 3.9	**Q5**	Oct 21	3.3, 3.4	3.3, 3.4
8	Oct 24 - 28	1.6, 3.6	**Q6**	Oct 28	3.5, 3.9	3.5, 3.9
9	Oct 31 - Nov 4	4.1, 4.2	No Quiz.	Nov 4	n/a	1.6, 3.6
Test 2 Friday, November 4, 2016 6:00 PM – 7:00 PM						
10	Nov 7 - 11	4.3, 4.5	Nov 11. Remembrance Day. No Lab. Complete the tutorial work sheet (4.1,4.2) on Moodle.			
11	Nov 14 - 18	4.7	**Q7**	Nov 18	4.3, 4.5	4.3, 4.5
12	Nov 21 - 25	4.9, 5.4, 5.1	**Q8**	Nov 25	4.7	4.7
13	Nov 28 - Dec 2	5.2, 5.3	No Quiz.	Dec 2. Last Lab.	n/a	4.9, 5.4, 5.1, 5.2, 5.3