THE UNIVERSITY OF BRITISH COLUMBIA

Department of Computer Science, Mathematics, Physics and Statistics

Okanagan Campus

MATH 142- 001 - CALCULUS II FOR MANAGEMENT AND ECONOMICS
2022W TERM -1 (SEPT. 6TH, 2022 – DEC. 8TH ,2022)

INSTRUCTOR:

Name: Paul Tsopméné
Contact: *paul.tsopmene@ubc.ca* (Preferred)
Office Location: SCI 259
Office Hours: Tuesday and Thursday: 5:00pm – 6:30pm. I am also available by email or by appointment if these times do not work for you.
Class Location: SCI 337

SCHEDULE:

Lecture: Tuesday and Thursday
Hours: 3:30pm – 5:00pm

GRADER/TA:

Name of TA:	Insha Hooda	insha25@student.ubc.ca
Name of TA:	Puneet Kaur Aulakh	puneetk1@mail.ubc.ca

All TAs can also be contacted on Canvas.

TEXTBOOK, OTHER REFERENCE MATERIAL, AND CALCULATORS:

Textbook: *Calculus with Applications,* by Margaret L. Lial, Raymond N. Greenwell, and Nathan P. Ritchey, 11th edition, Pearson. The textbook is OPTIONAL.
Exercise Book: *Calculus II for Management and Economics,* by Paul Tsopméné. This is free, and it is available on Canvas. It contains many problems, very detailed solutions, and concept summaries.
Calculators: The use of a scientific calculator (non-graphing, non-programmable) is permitted.

COURSE DESCRIPTION:

Course Website:
Course materials are available at https://canvas.ubc.ca. My primary method of communication is through Canvas messages/emails. Make sure you check this website regularly.

Academic Calendar Entry:
Continuation of MATH 116. Antiderivatives, the definite integral, integration techniques, numerical integration, double integrals, applications of integration including application to probability, elementary differential equations, functions of several variables; partial derivatives; Lagrange multipliers. Credit will be granted for only one of MATH 142 or MATH 101. [3-0-0]
Prerequisite: One of MATH 100, MATH 116.

Course Overview: This course will focus on single and double variables integral calculus and its applications. While the list of topics aligns well with a general calculus course, most of the concepts will be presented through applications in Business and Economics. The course will start off with the concept of integration. In this chapter we will learn how to find indefinite and definite integrals using rules. We will also learn how to find the area between two curves and integrate numerically. In the second chapter, we will learn how to integrate using integration by parts, integrate by using tables, find improper integrals, and use integrals to find average values and solve continuous money flow problems. In the third chapter, we will learn how to use integrals to solve separable differential equations and linear first-order differential equations. In the fourth chapter, we will learn how to maximize or minimize a function of two variables. We will also learn how to find double integrals. In the last chapter, we will learn how to calculate probabilities for continuous random variables and find the expected value, variance, and standard deviation of a continuous random variable.

Contents: Topics include

- **Integration:** Antiderivatives and Indefinite Integrals, Integration by Substitutions, Area and the Definite Integral, The Fundamental Theorem of Calculus, The Area Between Two Curves, Numerical Integration.
- **Further Techniques and Applications of Integration:** Integration by Parts, Integration Using Tables, Average Value, Continuous Money Flow, Improper Integrals.
- **Differential Equations:** Solutions of Elementary and Separable Differential Equations, Integrating Factors, Applications of Differential Equations.
- **Multivariable Calculus:** Functions of Several Variables, Partial Derivatives, Maxima and Minima, Lagrange Multipliers, Double Integrals.
- **Probability and Calculus:** Continuous Probability Models, Expected Value and Variance of Continuous Random Variables, Special Probability Density Functions (if time permits).

Learning Outcomes: After completing this course, students will be able to:

- Understand the basic idea of integral calculus: finding the area under a curve.
- Approximate the area under a curve by using the left, right, or midpoint Riemann sums.
- Evaluate integrals by using basic antiderivative formulas.
- Evaluate integrals by using techniques such as substitution and integration by parts.

- Use integrals to find the area between two curves, the cumulative/net change, and the average value of a function.
- Approximate the value of a definite integral using the midpoint rule, the trapezoidal rule, and Simpson's rule.
- Determine whether an improper integral converges or diverges, and evaluate it if it is convergent.
- Use integrals to solve continuous money flow problems.
- Solve separable and first-order differential equations. Specifically, students should be able to:
    - Use integrals to solve separable differential equations and linear first-order differential equations
    - Construct a differential equation modelling a quantity described in a problem.
- Find and interpret partial derivatives.
- Solve optimization problems involving several variables.
- Find double integrals.
- Calculate probabilities for continuous variables and find the expected values and the standard deviation.

Course Objectives: To enable the student to:

- Understand the fundamental concepts of integral calculus.
- Learn the most important techniques for calculating integrals.
- Practice how to apply these techniques to model and solve various problems including problems in Business and Economics.
- Gain some exposure to more advanced calculus concepts from a computational viewpoint as opposed to a full mathematically rigorous treatment.

Course Format: Lectures.

- **Lecture Format:** Each week (excepting holidays) there will be two lectures delivered in person. During a typical lecture, the instructor will present one or more concepts, cover examples, and answer questions. The focus will be on applications of the concepts, rather than proofs. **Our first class will hold on Tuesday, September 06, 2022.**
  Note: Questions are highly encouraged during the lecture! Please feel free to ask whatever questions you like.

LATE POLICY:

Assignments: Late submissions won't be considered. No extensions or make up assignments**.** If an assignment is missed for a valid reason (e.g., religious, medical or compassionate reasons, with documentation), the final exam will be weighted more heavily to compensate**.**

Midterms: No make-up midterms will be given. If a midterm is missed for a valid reason (e.g., religious, medical or compassionate reasons, with documentation), the other midterm and/or final exam will be weighted more heavily to compensate.

PASSING CRITERIA:

- In order to pass the course, you MUST attain a grade of at least 40% on the final exam AND your overall final grade has to be greater than or equal to 50%.

Note: In the event you do not get at least 40% on the final exam AND your final grade is less than 50%, your final grade will be recorded. In the event you do not attain at least 40% on the final exam AND your final grade is greater than or equal to 50%, a maximum grade of 47% will be recorded.

EXPECTATIONS:

You can expect me:
- To start and end class on time.
- To explain a concept or an example as many times as needed until you get it.
- To reply to e-mails within 24 hours on weekdays and 48 hours on weekends.
- To assign homework that adequately covers the material and meets the learning objectives of the course.
- To give exams that accurately reflect the material covered in class and assigned in homework.

I can expect you:
- To read and understand this course outline.
- To come to class on time.
- To be attentive and engaged in class (ask questions when you don't fully understand course material).
- To refrain from using laptops, cell phones, and other electronic devices during class.
- To spend an adequate amount of time on the homework each week, making an effort to solve and understand each problem.
- To come to me (or send me an email) if you need help or have any questions (including questions about the assignments).

TENTATIVE COURSE SCHEDULE:

The following course schedule is subject to change.

Weeks	Topics, Assignments, and Midterms
Sept. 5 – 9	Antiderivatives, Indefinite Integrals
Sept. 12 – 16	Substitution, Definite Integrals **Friday, Sept. 16: Release Assignment 1**
Sept. 19 – 23	The Fundamental Theorem of Calculus **Friday, Sept. 23: Release Assignment 2**
Sept. 26 – 30	The Area Between Two Curves, Numerical Integration

Oct. 3 – 7	Integration by Parts **Thursday, Oct. 6: Midterm 1 (3:30pm – 4:45pm, in SCI 337)**
Oct. 10 - 14	Average Value, Continuous Money Flow **Friday, Oct. 14: Release Assignment 3**
Oct. 17 – 21	Improper Integrals, Separable Differential Equations **Friday, Oct. 21: Release Assignment 4**
Oct. 24 – 28	Integrating Factors, Applications of Differential Equations **Friday, Oct. 28: Release Assignment 5**
Oct. 31 – Nov. 4	Functions of Several Variables, Partial Derivatives
Nov. 7 – 11	Midterm Break (no classes)
Nov. 14 – 18	Maxima and Minima **Thursday, Nov. 17: Midterm 2 (3:30pm – 4:45pm, in SCI 337)**
Nov. 21 – Nov. 25	Lagrange Multipliers, Double Integrals (over rectangles) **Friday, Nov. 25: Release Assignment 6**
Nov. 28 – Dec. 2	Double Integrals (over other regions), Continuous Probability Models
Dec. 5 – Dec. 9	Expected Value and Variance of Continuous Random Variables, Special Probability Density Functions

EVALUATION CRITERIA AND GRADING:

Assignments   20%
Midterms   35%
Final Exam   45%

Final grades will be based on the evaluations listed above and the final grade will be assigned according to the standardized grading system outlined in the UBC Okanagan Calendar.

Item	**Weighting**	**Date/Description/Comment**
Assignments	20%	There will be **six assignments** throughout the semester. These will be posted on Canvas on Fridays, and the due date will be next Friday at 11:59 PM. (Assignments will be released on the dates mentioned above.) To submit your assignment, you will have to upload the assignment as a single .pdf file on Canvas. Once you submit your work on Canvas, make sure to go back to the submission box on Canvas and check that your submission is uploaded correctly, and confirm that there are no missing pages. Try to complete and submit your work at least 12 hours before the due date. Remember: Always start the assigned work

Item	Weighting	Date/Description/Comment
		early. Do not leave things until the last minute. I will be available for help.
Midterm #1	17.5%	The first midterm will be held on **Thursday, October 6**, during class time. I will send you the midterm topics by email about a week before the date of each midterm.
Midterm #2	17.5%	The second midterm will be held on **Thursday, November 17**, again during class time.
Final Exam	45%	There is a 2.5-hours comprehensive final exam during the final examination period December 11 – 22. **Date: To Be Announced.** This is a cumulative final exam.

Practice Problems: Problems from my exercise book will be regularly assigned for practice. While completing these problems is essential for your success in this course, you do not hand them in for grading. **Note:** Questions in the assignments and midterms, as well as in the final exam, will be similar to those in the exercise book.

IMPORTANT DATES

Tuesday, September 6	Term 1 of Winter 2022 semester starts
Monday, September 19	Last day to withdraw without a W standing
Friday, September 30	National Day for Truth and Reconciliation (no classes)
Monday, October 10	Thanksgiving Day (no classes)
November 7 – 11	Winter session term 1 midterm break (no classes)
Friday, November 18	Last day to withdraw with a W standing
Tuesday, December 8	Last day of classes
December 11 – 22	Final examination period

Other calendar dates can be found at http://okanagan.students.ubc.ca/calendar/

Course Instructor: Dr. Paul Tsopmene   *Course Code: MATH 142-001*

GRADING PRACTICES

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to University, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record.

http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014

FINAL EXAMINATIONS

The examination period for W2022 is **Sunday December 11th, 2022, to Thursday December 22nd, 2022**. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 24-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job. Further information on **Academic Concession** can be found under **Policies and Regulation in the Okanagan Academic Calendar** http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0

ACADEMIC INTEGRITY

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at:
http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0.

COOPERATION VS. CHEATING

Working with others on assignments is a good way to learn the material and we encourage it. However, there are limits to the degree of cooperation that we will permit. Any level of cooperation beyond what is permitted is considered cheating.

When working on programming assignments, you must work only with others whose understanding of the material is approximately equal to yours. In this situation, working together to find a good approach for solving a programming problem is cooperation; listening while someone dictates a solution is cheating. You must limit collaboration to a high-level discussion of solution strategies, and stop short of actually writing down a group answer. Anything that you hand in, whether it is a written problem or a computer program, must be written by you, from scratch, in your own words. If you base your solution on any other written solution, you are cheating. If you provide your solution for others to use, you are also cheating.

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GRIEVANCES AND COMPLAINTS PROCEDURES

A student who has a complaint related to this course should follow the procedures summarized below:

- The student should attempt to resolve the matter with the instructor first. Students may talk first to someone other than the instructor if they do not feel, for whatever reason, that they can directly approach the instructor.
- If the complaint is not resolved to the student's satisfaction, the student should e-mail the Associate Head, Dr. Sylvie Desjardins at sylvie.desjardins@ubc.ca or the Department Head, Dr. John Braun at cmps.depthead@ubc.ca

STUDENT SERVICE RESOURCES

Disability Resource Centre

The Disability Resource Centre ensures educational equity for students with disabilities and chronic medical conditions. If you are disabled, have an injury or illness and require academic accommodations to meet the course objectives, please contact Earllene Roberts, the Diversity Advisor for the Disability Resource Centre located in the University Centre building (UNC 215).

UNC 215 250.807.9263
email: earllene.roberts@ubc.ca

Web: www.students.ok.ubc.ca/drc

Equity and Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.

UNC 325H 250.807.9291
email: equity.ubco@ubc.ca
Web: www.equity.ok.ubc.ca

Office of the Ombudsperson for Students

The Office of the Ombudsperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving. If you require assistance, please feel free to reach out for more information or to arrange an appointment.

UNC 328 250.807.9818
email: ombuds.office.ok@ubc.ca
Web: www.ombudsoffice.ubc.ca

Sexual Violence Prevention and Response Office (SVPRO)

A safe and confidential place for UBC students, staff and faculty who have experienced sexual violence regardless of when or where it took place. Just want to talk? We are here to listen and help you explore your options. We can help you find a safe place to stay, explain your reporting options (UBC or police), accompany you to the hospital, or support you with academic accommodations. You have the right to choose what happens next. We support your decision, whatever you decide.
Visit svpro.ok.ubc.ca or call us at 250-807-9640.

Independent Investigations Office (IIO)

If you or someone you know has experienced sexual assault or some other form of sexual misconduct by a UBC community member and you want the Independent Investigations Office (IIO) at UBC to investigate, please contact the **IIO**. Investigations are conducted in a trauma informed, confidential and respectful manner in accordance with the principles of procedural fairness.

You can report your experience directly to the **IIO by** calling 604-827-2060.
Web: https://investigationsoffice.ubc.ca/
E-mail: director.of.investigations@ubc.ca

Student Learning Hub

The Student Learning Hub (LIB 237) is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with study skills and learning strategies**.
For more information, please visit the Hub's website (https://students.ok.ubc.ca/student-learning-hub/) or call 250-807-9185.

Student Wellness

At UBC Okanagan health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Student Wellness for more information or to book an appointment.

UNC 337 250.807.9270
email: healthwellness.okanagan@ubc.ca
Web: www.students.ok.ubc.ca/health-wellness

SAFEWALK
Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at
250-807-8076.
For more information, see: www.security.ok.ubc.ca