THE UNIVERSITY OF BRITISH COLUMBIA

Department of Computer Science, Mathematics, Physics and Statistics
Okanagan Campus

MATH 142 - 001
Calculus II for Management and Economics
W2021 T-2 (Jan. – April 2022)
Course Outline

_____

Course Information

Instructor: Dr. Paul Tsopméné   **E-mail:** paul.tsopmene@ubc.ca

Classroom Schedule: Tuesday, Thursday: 8:00 AM – 9:30 AM

Mode of Delivery: Online   **Requires In-Person Attendance:** No

Location: On-line through Zoom.   Here is the Zoom link:
        https://ubc.zoom.us/j/68023746558?pwd=eTA1RlJ5encvWmV6MEprL04yWVVoQT09

Office Hours: Tuesday and Thursday: 10:00 AM – 11:30 AM. These will be conducted on Zoom. Here is the link:
https://ubc.zoom.us/j/62333929367?pwd=aGtpUTBTWE1lMzInUkxBaFlRMGx0Zz09
 I am also available by email or by appointment if these times do not work for you.

Course Website: Course material on our Canvas learning management system. My primary method of communication is through Canvas messages/emails. Make sure you check this website regularly.

TA's Names and Contacts:

- **Lab Instructors:** N/A
- **Grading and Course Support:** Insha Hooda (inshahooda@gmail.com), Heejun Song (heejunsong2384@gmail.com)

Textbooks and Calculators

Textbook (optional):   *Calculus with Applications,* by Margaret L. Lial, Raymond N. Greenwell, and Nathan P. Ritchey, 11th edition, Pearson. It is available in the bookstore.

Calculators: The use of a scientific calculator (non-graphing, non-programmable) is permitted.

Calendar Course Description

MATH 142 (3) Calculus II for Management and Economics
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 Format

Lectures:

- **Lecture Format:** Each week (excepting holidays) there will be two lectures delivered online via Zoom. 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, January 11, 2022.**
  Note: The lectures will be delivered synchronously, and will be recorded and posted on Canvas. So, if you can't attend live, you can watch the lecture later. Even though we are doing this remotely, questions are highly encouraged during lecture! Please feel free to ask whatever questions you like in the chat or aloud.

Course Overview, Content and Objectives

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, 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).

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.

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.

Devices and Invigilation

Devices: This course is being offered in an online format only. You must have all of the following items to participate in this course.

1. A working laptop or desktop computer.
2. A working microphone.
3. A working webcam – external or integrated.
4. A working smartphone or similar device capable of taking a Zoom call and uploading files to Canvas.
5. A tripod or other type of apparatus you can use to put your smartphone or secondary device in a variety of positions.
6. A stable internet connection with enough bandwidth to be connected to Zoom and Canvas simultaneously.

Invigilation: This course uses Respondus Lockdown Browser and Zoom for invigilation of the midterms and final exam. These tools are chosen in order to address accreditation requirements and maintain academic integrity for tracking academic progress of individual students. **More information can be found in the document titled ``ONLINE TEST INFORMATION'', which is posted on Canvas.**

Evaluation

Assignments (Due Friday 11:59 PM)	15%
Midterm 1 (Thursday, February 17 at 8:00 AM in class)	17.5%
Midterm 2 (Thursday, March 24 at 8:00 AM in class)	17.5%
Final Exam (Cumulative – TBA)	50%

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.

Note:

- **Students MUST attain a grade of at least 40% on the Final Exam in order to pass the course.**

  - In the event a student does not get at least 40% on the final exam AND the final grade is less than 50%, the final grade will be recorded.

  - In the event a student does not attain at least 40% on the final exam AND the final grade is greater than or equal to 50%, the maximum grade of 47% will be recorded.

- **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%.

- **Mode of Delivery for Exams:** Online

- **Examination Period:** The final exam will be given during the regularly scheduled examination period (April 14 – 29, 2022).

Practice Problems, Assignments, Midterms, and Final Exam

- **Practice Problems:** Problems along with complete solutions will be posted on Canvas every week. While completion of these problems is essential for your success in this course, **you do not hand them in for grading.**

- **Assignments:** There will be 6 assignments throughout the semester. These will be posted on Canvas on Fridays and the **due date will be on the next Friday at <u>11:59 PM</u>. To submit your assignment, you will have to upload the assignment as a <u>single .pdf file</u> on Canvas.** Once you submit your work on Canvas, **<u>make sure to go back</u>** to the submission box on Canvas and check that your submission is uploaded properly and confirm no missing pages. Try to complete and submit your work at least 12 hours before the due date. **Remember:** Always start the assigned work early. Do not leave things until the last minute. I will be available for help during my office hours or by emails.
  Late Policy: Late submissions won't be considered. No extensions or make up assignments. If an assignment/notes 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**.**
  Your worst assignment grade will be dropped from the total.

Assignment #	Will be posted on	Due date
1	January 21	January 28
2	January 28	February 4
3	February 4	February 11
4	March 4	March 11
5	March 11	March 18
6	April 1	April 8

- **Midterms:** There will be 2 midterm exams (60 minutes each).

Midterm 1	**Thursday, February 17 at 8:00 AM (during the class time)**
Midterm 2	**Thursday, March 24 at 8:00 AM (during the class time)**

  I will send you the midterm topics by email about a week before the date of each midterm. The midterms will be written during the class time. **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**. Travel or work are usually not acceptable excuses.

- **Final Exam:** There is a 2.5-hours comprehensive final exam during the final examination period April 14 – 29. Date: TBA**.** This is a cumulative final exam. **You MUST attain a grade of at least 40% on the final exam in order to pass the course**.

Important Dates

Monday, January 10	Term 2 of Winter Session 2021/22 semester starts
Friday, January 21	Last day for withdrawal without receiving a ``W'' standing
February 21 – 25	Winter session term 2 midterm break (no classes)
Friday, March 18	Last day for withdrawal with a ``W'' standing
Monday, April 11	Last day of classes
April 14 – 29	Final examination period

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

Tentative Course Schedule

This is subject to change

Lecture Week	Topics, Assignments, and Midterms
Jan. 10 – 14	Antiderivatives, Indefinite Integrals
Jan. 17 – 21	Substitution, Definite Integrals **January 21: Release Assignment 1**
Jan. 24 – 28	The Fundamental Theorem of Calculus **January 28: Release Assignment 2**
Jan. 31. – Feb 4	The Area Between Two Curves, Numerical Integration **February 4: Release Assignment 3**
Feb. 7 – 11	Integration by Parts, Average Value
Feb. 14 - 18	Continuous Money Flow **Thursday, February 17: Midterm 1**
Feb. 21 – 25	**Winter Break (no classes)**
Feb 28 – Mar. 4	Improper Integrals, Solutions of Elementary and Separable Differential Equations **March 4: Release Assignment 4**
Mar. 7 – 11	Applications of Differential Equations, Functions of Several Variables **March 11: Release Assignment 5**
Mar. 14 – 18	Partial Derivatives, Maxima and Minima
Mar. 21 – 25	Lagrange Multipliers **Thursday, March 24: Midterm 2**
Mar. 28 – April 1	Double Integrals **April 1: Release Assignment 6**
April 4 - 8	Continuous Probability Models, Expected Value and Variance of Continuous Random Variables

Potential Restrictions to International Students' Online Learning Experiences

During this pandemic, the shift to online learning has greatly altered teaching and studying at UBC, including changes to health and safety considerations. Keep in mind that some UBC courses might cover topics that are censored or considered illegal by non-Canadian governments. This may include, but is not limited to, human rights, representative government, defamation, obscenity, gender or sexuality, and historical or current geopolitical controversies. If you are a student living abroad, you will be subject to the laws of your local jurisdiction, and your local authorities might limit your access to course material or take punitive action against you. UBC is strongly committed to academic freedom, but has no control over foreign authorities (please visit: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,33,86,0 for an articulation of the values of the University conveyed in the Senate Statement on Academic Freedom). Thus, we recognize that students will have legitimate reason to exercise caution in studying certain subjects. If you have concerns regarding your personal situation, consider postponing taking a course with manifest risks, until you are back on campus or reach out to your academic advisor to find substitute courses. For further information and support, please visit: http://academic.ubc.ca/supportresources/freedom-expression

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 **W2021 T-2 is April 14 - 29, 2022**. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 27-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.

Copyright Disclaimer

Diagrams and figures included in lecture presentations adhere to Copyright Guidelines for UBC Faculty, Staff and Students http://copyright.ubc.ca/requirements/copyright-guidelines/ and UBC Fair Dealing Requirements for Faculty and Staff http://copyright.ubc.ca/requirements/fair-dealing/. Some of these figures and images are subject to copyright and will not be posted to *Canvas.* All material uploaded to *Canvas* that contain diagrams and figures are used with permission of the publisher; are in the public domain; are licensed by Creative Commons; meet the permitted terms of use of UBC's library license agreements for electronic items; and/or adhere to the UBC Fair Dealing Requirements for Faculty and Staff. Access to the *Canvas* course site is limited to students currently registered in this course. Under no circumstance are students permitted to provide any other person with means to access this material. Anyone violating these restrictions may be subject to legal action. Permission to electronically record any course materials must be granted by the instructor. Distribution of this material to a third party is forbidden.

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 (PRO TEM), Dr. Andrew Jirasek at andrew.jirasek@ubc.ca

Student Service Resources

Disability Assistance
The Disability Resource Centre ensures educational equity for students with disabilities, injuries or illness. If you are disabled, have an injury or illness and require academic accommodations to meet the course objectives, e-mail us or visit our website for more information.
Web: http://students.ok.ubc.ca/drc/welcome.html   **E-mail** DRC at: drc.questions@ubc.ca

Equity, Human Rights, Discrimination and Harassment
UBC Okanagan is a place where every student, staff and faculty member should be able to study and work in an environment that is free from human rights-based discrimination and harassment. If you require assistance related to an issue of equity, discrimination or harassment, please contact the Equity Office, your administrative head of unit, and/or your unit's equity representative.   **UBC Okanagan Equity Advisor: ph. 250-807-9291**
Web: https://equity.ok.ubc.ca/   **E-mail:** equity.ubco@ubc.ca

Health & Wellness - UNC 337
At UBC Okanagan health services to students are provided by Health and 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 Health and Wellness for more information or to book an appointment.
Web: www.students.ok.ubc.ca/health-wellness   **Email:** healthwellness.okanagan@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

The 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**. **Web:** (https://students.ok.ubc.ca/student-learning-hub/) **Ph:** 250-807-9185.

SAFEWALK - Download the UBC SAFE – Okanagan app.
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: https://security.ok.ubc.ca/safewalk/