MATH 101: INTEGRAL CALCULUS WITH APPLICATIONS

The University of British Columbia
2024 WT2

ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam). The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on culture, history, and traditions from one generation to the next.

If you would like to know more about the joint history of UBC and Musqueam, one place to start is at UBC's Indigenous portal.

COURSE DESCRIPTION

Course Title	**Course Code Number**	**Credit Value**
Integral Calculus with Applications	MATH 101	3

MATH 101 involves both topics from integral calculus as well as multi-variable calculus. Students will learn the basic ideas, tools and techniques that they can use to solve problems with real-life applications.

Enrolment in this course requires a passing grade in one of: MATH 100; MATH 102; MATH 104; MATH 110; MATH 120; MATH 180; MATH 184.

CONTACTS

Do not email your instructor directly with questions, you are encouraged to attend office hours, and ask questions during lectures and especially during small classes. For questions about mathematics and homework, use the Piazza forum. The Math Learning Centre is also available for additional homework help.

For questions and issues regarding personal or administrative matters, use the Calculus Contact Form. This form can be found on your class Canvas site or here.

For office hours, please see Canvas → Calculus Common Room (Office hours).

INSTRUCTORS

The large class instructors:

MATH 101A	MATH 101B	MATH 101C
Nahid Walji Dragos Ghioca	Mark Mac Lean Seckin Demirbas	Stephen Gustafson Matthew Coles

COURSE STRUCTURE

There are three "flavours" of MATH 101, each with different applications.
Flavour "A" includes applications to Physical Sciences and Engineering.
Flavour "B" includes applications to Biology and Life Sciences.
Flavour "C" includes applications to Commerce and Social Sciences.

All flavours share a similar style of homework, tests and exams. The underlying concepts taught in each flavour will largely be the same, but the context they are referenced in may be different, hence the distinction by "flavour".

Most weeks, you will be expected to: attend one 2-hour lecture taught by a large class instructor; attend one 1-hour small class taught by a small class instructor and TA; complete one WeBWorK assignment. There will be group work in small classes so attendance is mandatory, and will be taken.

Every two weeks you can expect to either submit a Group Project OR write a Midterm Test.

The final exam for this class will take place during the final exam period (date TBD).

LEARNING MATERIALS AND TEXTBOOKS

Our course materials are linked to UBC's learning management system, Canvas.

The primary textbook for this class is CLP–2, Integral Calculus. For topics in probability, we will use Optimal, Integral, Likely. Both of these textbooks are available online, free of charge. Physical copies are not sold by the university, though most printing/copy shops will print and bind them when given the link.

Students are expected to have regular access to a computer and the internet, submitting WeBWorK assignments and Group Projects will be submitted via Canvas or WeBWorK.

GRADING AND EVALUATION

Your provisional course grade will be calculated as follows:

10% WeBWorK assignments

10% Group Projects

20% Tests (10% each)

10% Engagement

50% Final exam

0.1 WeBWorK ASSIGNMENTS

There are 12 WeBWorK assignments (WW1, WW2, etc), but only the scores of your top 10 will be used to compute your mark. This is intended to account for technical difficulties, illness, and other personal situations. You can access WeBWorK on the sidebar.

If you would like to get some Precalculus practice, it is encouraged that you do some Pre-Calculus WeBWorK lessons in the Precalculus Review course that you can find in Canvas courses. **These lessons are not scored, and do not contribute to your course grade.**

0.2 GROUP PROJECTS

There are three group projects, that together make up 10% of your final grade. These projects explore and extend core concepts. They may be challenging: it is normal to spend several days on each one. Assignments are graded on clarity and coherence as well as correctness. They must be well written, clearly presented, and typed; handwritten submissions will receive a grade of 0.

It is expected and encouraged for your group to work with other groups on these assignments. However, your group must write up its assignment independently, and any ideas inspired by discussions with students outside your group must be acknowledged in your submission.

Students are largely expected to resolve interpersonal issues themselves, iPeer should be used to help you do this by expressing concerns to your team members anonymously. If there are major dysfunctions in your group, you can report them via the Calculus Contact Form, this should be done as early as possible in the semester.

0.3 TESTS

There are two in-term tests in MATH 101, each worth 10% of your provisional grade; both are written individually, not in groups. The sole source of information related to in-term tests will be the Canvas "Tests" page.

When asking questions about the midterm you will likely be met with the response "please check the 'Tests' page on Canvas", this isn't an intentional effort to be unhelpful, but an attempt to ensure fair evaluation of the numerous (approximately 4000) students in MATH 101, such that a subset of students are not advantaged by information made available to them exclusively.

0.4 ENGAGEMENT

Engagement is worth 10% of your final grade. Each time you do not engage sufficiently with one of the listed activities, 1% will be deducted from your engagement grade.

Small classes: Attendance and active participation within small classes comprise the majority of your engagement grade. Asking questions and contributing to team problem solving are good examples of active participation. You may be absent from one small class without penalty; this is intended to account for illness, injury, and other personal situations.

Reflection questions: Each group project includes a reflection section. Reflection is an important ingredient for success, especially given the significant differences between high school and university-level mathematics. This question is designed to help you reflect on the learned concepts and your progress within the course. The first question on each Group Project will be a reflection question and you will lose 1 engagement point for every reflection question you do not answer; the criteria to this question are not strict but your answer should be thoughtful and demonstrate your efforts to engage with the course material.

iPeer evaluations: After submitting each group project you will be asked to complete an evaluation of the other members of your group through iPeer. You will lose 1 engagement point if you do not complete an evaluation for all other members of your group.

Other engagement grades: There may be other opportunities to participate throughout the term. In some cases, failing to complete an engagement task will result in a penalty.

0.5 FINAL EXAM

The final exam is an evaluative assessment of your understanding of the course material, information relating to the exam will be published on Canvas. The date and time of the exam will be published on Workday later in the semester; please do not make travel arrangements prior to its announcement.

Final exams are not returned, but if you would like to view yours, you need to fill out the exam viewing form and follow the instructions provided.

The UBC Calendar page on Student Conduct during Examinations regulates final exams that occur for all UBC courses, it forms the basis of regulations for the final exam and tests in this course. More instructions will be provided closer to each test and the final exam, you must abide by the general UBC exam regulations and all instructions provided by instructors and invigilators. Unless specifically stated otherwise, notes, calculators, cell phones and other electronic devices are strictly prohibited from use during the exam. This includes use of cell phones for checking the time.

IMPORTANT DATES

MIDTERM EXAMS

Test 1: Mid February - see Canvas for more detail.

Test 2: Mid March - see Canvas for more detail.

FINAL EXAM

The final exam date and time will be finalized during the semester and can be accessed via Workday Student. Please do not make travel arrangements prior to its release.

OTHER DATES

Midterm Break: February 17th - 21st
Last day to drop without a "W" standing: January 17th
Last day to withdraw with a "W" standing: March 7th

A tentative schedule of classes can be found at the end of this document.

POLICIES AND RESOURCES TO SUPPORT STUDENT SUCCESS

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here.

Classes may be cancelled under extreme weather (most commonly heavy snowfall), cancellation will always be announced on Canvas in accordance with weather advisory posted by UBC. You can check official campus notifications here.

ACADEMIC POLICIES

This is a long-winded and exhaustive description of the academic policies governing this course. It complements the usual academic policies governing all courses at UBC (here).

LATE SUBMISSIONS, MISSED ASSESSMENTS & MISSED CLASSES

Group projects will be accepted up to 24 hours after the submission deadline, assignments submitted during this window are subject to a 15% penalty. Group projects will not be accepted more than 24 hours after the submission deadline.

WeBWorK assignments will not be accepted after the submission deadline. Only the highest scoring 10 of the 12 WeBWorK assignments are considered in the calculation of your final grade, this is intended to reduce administrative burden while accounting for illness, injury and other personal circumstances that prevent students from completing these assignments.

Tests are written in-class. If you cannot write a test (for valid reasons), please request concession via the Calculus Contact Form. Circumstances which warrant concession are described in CONCESSIONS. Short term illnesses are self-declared; medical documentation from a physician is not required.

The **final exam** for this course is a major assessment, no-one in the Math department (instructors, staff, TA's, the department head) can grant concession for this assessment. If you cannot write the final exam (for valid reasons), do not attempt to write it, instead contact your faculty's advising office as soon as possible. The process for obtaining a concession on the final exam differs by faculty (Science, Arts, APSC, etc.), though it is typically more rigorous than obtaining an in-term concession; be prepared to provide documents (e.g. a medical certificate) supporting your request.

If you are absent from a **large class** you do not have to inform anyone of your absence. It is expected that you will be responsible for your own learning and catch up on the material missed in your own time; some instructors will provide helpful resources (such as lecture notes) on Canvas.

You do not need to inform anyone of your first small class absence: All students can be absent from one small class without consequence, this small class, despite not appearing as 'excused' in the Canvas Gradebook, will not affect your engagement score for this class. The policy of forgiving one absence is intended to ease administrative burden and will be used to account for the first instance of illness, injury or other personal circumstance that prevents you from attending class.

If you are absent from additional small classes please complete the calculus contact form, briefly describing which small classes you missed and why you were absent; in most cases of illness/injury supporting documentation is not required. Again, it is expected you will be responsible for your own learning and catch up on missed material in your own time.

CONCESSIONS

Requests for in-term concessions are to be directed to the Calculus Contact Form and will be treated in accordance with the UBC senate rulings (Policy V-135) for academic concession. Grounds for academic concession may exist when a student's personal circumstance unexpectedly or unavoidably hinders or prevents them from fulfilling the requirements of a course in a timely manner.

Concessions for missed assessments are considered and offered on a case-by-case basis, no two students will undertake the academic load of this course in the same way, and as such require different consideration; a friend or fellow class member receiving concession for an assessment does not guarantee the same or any concession will be offered to you.

Concessions cannot be offered to students where grounds for concession depend upon long-term conditions (chronic injuries, illnesses, mental health conditions, etc.) without endorsement from the student's administering faculty or the Centre for Accessibility (CfA).

Requests for concession must be delivered in a reasonable time, unreasonably late requests will be deferred to your administering faculty.

Falling ill on the day of an assignment deadline (excluding tests) or experiencing technical issues in general does not qualify for concession or waiving of any late penalties; this is something you should plan around and take precautions against.

Group projects are made available for an extended time (normally 2-3 weeks) and are completed in groups, these factors generally preclude them from concession however, requests will be considered on a case-by-case basis. The standard concession offered to students who qualify is to replace the score of the missed group project with the average score of the student's remaining group projects.

WeBWorK assignments are available for a week each, are completed online, and can be completed from anywhere. The high accessibility of these assignments generally preclude them from concession however, requests are considered on a case-by-case basis. Only 10/12 WeBWorK assignments are used to calculate a student's course grade, this policy will be used to account for the first two WeBWorK assignments a student has missed. If a student misses further WeBWorK assignments the standard concession offered is to substitute the scores with the average score of the remaining scored WeBWorK assignments.

Tests are major assessments in this course, each worth 10% of your final grade. If you are absent for an in-term test (for valid reasons) the standard concession provided is to shift the weight of that test to the final exam. Being absent for both in-term tests is cause for concern, upon requesting concession for your second in-term test you will be directed to request concession from your administering faculty's advising office (or equivalent).

The **final exam** is not an in-term assessment. As described in LATE SUBMISSIONS & MISSED ASSESSMENTS instructors and staff in the Math department cannot offer concession on the Final Exam; you will be directed Standing Deferred (SD) status from your administering faculty. SD status in MATH 101 is the only concession available for the Final Exam, and may only be granted by the advising office of your administering faculty, read more about standing deferred status here

REGRADE REQUESTS

Errors in small class engagement marks will be checked against an internal record; if the internal record also suggests a student

Regrade requests for **Group projects** can be submitted to the calculus contact form up to 48 hours after the marked assignment is returned.

Regrade requests for **WeBWorK assignments** will not be accepted. If an error exists in a WeBWorK question you should check Piazza for a post that describes the error, if no post exists one should be created describing the error.

The process for requesting a regrade of **tests** will be described on the "Tests" page on Canvas, and announced upon release of in-term test grades.

Requesting a regrade of a **final exam** is a formal process requested via enrolment services, known as a review of assigned standing (more information here). It is recommended that you request a viewing of your final exam prior to requesting a review of assigned standing.

TENTATIVE SCHEDULE OF TOPICS

Week #	Large class date (by section)			Topics
	2A_	2B_	2C_	
1	Jan. 7	Jan. 8	Jan 9	Introduction to the definite integral; Area function; Fundamental Theorem of Calculus
2	Jan. 14	Jan. 15	Jan. 16	Fundamental Theorem of Calculus cont.; Antidifferentiation; Applications of integration
3	Jan. 21	Jan. 22	Jan. 23	Integration by substitution; Integration products of sines and cosines
4	Jan. 28	Jan. 29	Jan. 30	Trigonometric substitution; Partial fractions; Applications of integration: (A): volumes (B): mass (C): surplus
5	Feb. 4	Feb. 5	Feb. 6	Integration by parts; Right Riemann approximation; Trapezoid rule
6	Feb. 11	Feb. 12	Feb. 13	**test 1** ; Simpson's rule; Numerical integration
-	Feb. 18 (No class)	Feb. 19 (No class)	Feb. 20 (No class)	Midterm break
7	Feb. 25	Feb. 26	Feb. 27	Improper integrals; Comparison tests for convergence of improper integrals; Introduction to the Probability Density Function (PDF)
8	Mar. 4	Mar. 5	Mar. 6	Probability; Variance and standard deviation
9	Mar. 11	Mar. 12	Mar. 13	Introduction to sequences and series; Integral test; Geometric series
10	Mar. 18	Mar. 19	Mar. 20	**test 2** ; Direct comparison test; Limit comparison test

TENTATIVE SCHEDULE OF TOPICS CONT.

Week #	Large class date (by section)			Topics
	2A_	2B_	2C_	
11	Mar. 25	Mar. 26	Mar. 27	Ratio test; power series; Taylor series
12	Apr. 1	Apr. 2	Apr. 3	Taylor series cont.; Error in Taylor approximations
13	Apr. 8 (class cancelled)	Apr. 9 (no class)	Apr. 10 (no class)	End of semester