

MATH 101 – Calculus II

Department of Mathematics & Statistics,
University of Northern British Columbia

January 2022, Agora 7–238, MWF 1:30 pm — 2:20 pm

ESSENTIALS

INSTRUCTOR:	Dr. Mohammad El Smaily
EMAIL:	mohammad.elsmaily@unbc.ca
TEL:	250-960-6624
OFFICE:	T&L, 10-2044
OFFICE HOURS:	TBA

LECTURES:

Agora 7–238, Mon-Wed-Fri 1:30 pm — 2:20 pm

COURSE DESCRIPTION:

This course is a continuation of Math 100. We shall cover the following list of topics, with other topics as time permits: the natural logarithm as an integral and the exponential function as its inverse, integration by parts, various integration techniques, improper integrals, volumes by slicing and by shell techniques, the trapezoidal rule and Simpson's rule, infinite sequences and series, masses, volumes, moments, centre of mass, first order linear differential equations.

Prerequisites: MATH 100 or MATH 105 (with minimum grade of C-).

TEXTBOOK:

Calculus, Volume 2, openstax.

This book is free and available for download—see the link below.

Link to textbook: <https://openstax.org/details/books/calculus-volume-2>

Course Chapters: The course covers Chapters 1, 2, 3, 7 and 5 (with an omission of some sections).

For details, see the section "Tentative Syllabus" at the end of this document.

COURSE WEB PAGE:

We use Blackboard <https://learn.unbc.ca> to post all materials for this course and make announcements.

GRADING SCHEME:

Your Math 101 final grade is computed according to the following scheme:

Mobius (online) Assignments: **10%**

Classical Assignments: **15%** (hand written solutions)

Midterm Exam 1: **15%**

Midterm Exam 2: **15%**

Lab Attendance: **5%**

Final Exam: **40%**

ASSIGNMENTS:

Assignments will be given and posted on Blackboard. **This course has both class assignments (hand-written and submitted in class) and lab assignments (done in Maple and submitted in lab).** There will be approximately 10 class assignments (almost weekly), and there will be a total of 5 Lab assignments.

Your lab section is meant to aid you with your assignments but there is no expectation that you will finish your assignment during lab. The due dates will be written on the assignments. Assignments must be handed in on time. Late assignments will only be accepted for medical or compassionate reasons. Please note that lab sections will alternate between lab assignments and tutorials each week. Lab attendance is mandatory as reflected by the above grading scheme.

MIDTERM EXAMS:

There will be **two midterm exams**. Midterm Exam 1 will be on **Friday, Feb. 11** and Midterm Exam 2 will be on **Monday, March 14**. The exams will start promptly at **1:30** am and last 50 minutes. If you have an unavoidable conflict with a scheduled exam, it is your responsibility to inform me as soon as possible (preferably one week in advance); decisions in this regard will be made on a case-by-case basis.

FINAL EXAM:

TBA by the Registrar's Office. Do not book your flights to conflict with your test or exam times! Final exam will be **comprehensive and will include all the material covered in the course**.

Students are required to bring their student I.D. to each exam. No books, no notes, no calculators, no formula sheets, and no electronic devices may be used on the exams. Students caught with an electronic device during a midterm or final exam will have their exam taken and you will receive an automatic grade of zero on the exam.

IMPORTANT DATES:

First day of classes: Wed 5 January

Midterm 1: Friday, Feb. 11

Midterm 2: Monday, March 14

Add/Drop Date: Wednesday January 19

Family Day: Mon 21 February

Mid-Semester Break: Tuesday 22 February - Friday 25 February

Withdrawal Date: Thursday 24 February

Final Exam Period: Fri 8 April - Fri 22 April

EXPECTATIONS:

- Much of the skill in Math 101 is gained through practice. It is recommended that you devote at least 6 extra hours of personal work per week to this course. Solve all problems from the assigned homework and the suggested problems posted weekly on the Blackboard course webpage. Do as many problems as you are able to! Discussion with your classmates is encouraged. However keep in mind that on the exams you work independently.
- Do not let yourself fall behind on assignments. Do not postpone getting help until the last minute. The main help in this course is provided by the instructor during office hours. The students are also encouraged to visit the Academic Success Centre and inquire about the various options for help with this course (visit www.unbc.ca/asc for more information), or visit the Mathematical Academic Centre of Excellence (10-2088), where they can discuss mathematics with other fellow students and support staff and work on their assignments.
- Attend all lectures and lab sessions. Please be considerate of your classmates; try not to be late for class and do not use cell phones or laptop computers during class.
- Review your notes soon after class and prior to the next class.
- During the lecture, participate by answering questions and feel free to interrupt the instructor to ask questions.

SPECIAL ARRANGEMENTS:

Students with disabilities who would like to receive access and academic accommodations through the Access Resource Centre (ARC) need to self-identify and register with the centre. Please see <http://www.unbc.ca/access-resource-centre>. The students who have registered for accommodations with the ARC must ensure that the instructor is informed of the necessary arrangements as soon as possible.

ACADEMIC REGULATIONS:

It is the students' responsibility to familiarize themselves with the regulations concerning academic integrity and ensure that their course work conform to the principles of academic integrity. Please read the academic regulations found at:

<http://www.unbc.ca/calendar/undergraduate/general/regulations.html>.

In particular, read sections 40, 41, 42, 43, 44, and 45.

TENTATIVE SYLLABUS

- Chapter 1: Integration
 - 1.1 Approximating Areas
 - 1.2 The Definite Integral
 - 1.3 The Fundamental Theorem of Calculus
 - 1.4 Integration Formulas and the Net Change Theorem
 - 1.5 Substitution
 - 1.6 Integrals Involving Exponential and Logarithmic Functions
 - 1.7 Integrals Resulting in Inverse Trigonometric Functions
- Chapter 2: Applications of Integration
 - 2.1 Areas between Curves
 - 2.2 Determining Volumes by Slicing
 - 2.3 Volumes of Revolution: Cylindrical Shells
 - 2.4 Arc Length of a Curve and Surface Area
 - 2.5 Physical Applications
 - 2.6 Moments and Centers of Mass
 - 2.7 Integrals, Exponential Functions, and Logarithms
 - 2.8 Exponential Growth and Decay
 - 2.9 Calculus of the Hyperbolic Functions
- Chapter 3: Techniques of Integration
 - 3.1 Integration by Parts
 - 3.2 Trigonometric Integrals
 - 3.3 Trigonometric Substitution
 - 3.4 Partial Fractions
 - 3.5 Other Strategies for Integration
 - 3.6 Numerical Integration
 - 3.7 Improper Integrals
- Chapter 7: Parametric Equations and Polar Coordinates
 - 7.1 Parametric Equations
 - 7.2 Calculus of Parametric Curves
 - 7.3 Polar Coordinates
 - 7.4 Area and Arc Length in Polar Coordinates

- Chapter 5: Sequences and Series
 - 5.1 Sequences
 - 5.2 Infinite Series
 - 5.3 The Divergence and Integral Tests
 - 5.4 Comparison Tests
 - 5.5 Alternating Series
 - 5.6 Ratio and Root Tests