School of Science
**MATH 100**
**Single Variable Calculus I**
**Term: Fall 2021**
**Number of Credits: 3**

# MATH 100 - COURSE OUTLINE

**INSTRUCTOR:** Jaclyn Semple
**E-MAIL:** jsemple@yukonu.ca
**OFFICE LOCATION:** A2410

**CLASSROOM:** A2206 (Lecture Hall)
**CLASS TIMES:** Mon/Wed/Fri, 9 – 10:20am
**DATES:** Sept 8 – Dec 7, 2021

## COURSE DESCRIPTION

This is a first course in calculus. The topics include limits and continuity; the derivatives of elementary, trigonometric and logarithmic/exponential functions; applications of the derivative in solving problems and graphing; and integration of elementary and trigonometric functions. Also covered are the Mean Value Theorem and the first and second fundamental theorems of calculus.

## COURSE REQUIREMENTS

Prerequisite(s): 65% or better in either MATH 060 or MATH 12

## EQUIVALENCY OR TRANSFERABILITY

Receiving institutions determine course transferability. Find further information at:
https://www.yukonu.ca/admissions/transfer-credit

## LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Apply the concept of the limit of a function in order to determine the continuity and end behaviour of a function.
- Establish the concept of the derivative in terms of limits and demonstrate proficiency in basic differentiation techniques, including: power rule, product rule, quotient rule, chain rule and trigonometric differentiation.
- Use graphing techniques related to differentiation and solve applied differentiation problems such as related rates and optimization.
- Apply the Fundamental Theorem of Calculus and demonstrate the relationship between the area as a limit and the definite and indefinite integral.
- Demonstrate basic integration techniques, including the antiderivative and substitution methods.
- Apply integration techniques to problems involving areas and volumes.

## COURSE FORMAT

### Weekly breakdown of instructional hours

Lectures: 3 hours per week
Tutorial: 1 hour per week

The course content is covered through lectures, in-class tutorials, and homework assignments using the prescribed textbook and accompanying online homework system. Students with a sound mathematical background can expect to spend 2—4 hours in preparation and study for every hour spent in class.

### Delivery format

Lectures for the Fall 2021 offering of this course will be delivered in a "HyFlex" format in which course material is delivered both in-person and online at the same time by the same instructor. Students can choose whether to attend classes in person or to join in online. In-person lectures will be delivered on the Ayamdigut (Whitehorse) campus; the real-time stream of these lectures will be available on Zoom. Due to the complex subject matter covered in this course, it is strongly recommended that students choose the face-to-face option if possible.

Course material will be posted on Moodle and WileyPLUS, including weekly lecture notes, textbook readings, homework problems, quizzes, announcements, and other useful or interesting material related to the course.

## EVALUATION

| | |
|---|---|
| Homework | 20% |
| Quizzes | 20% |
| Midterm Test | 25% |
| Final Exam | 35% |
| **Total** | **100%** |

### Homework (20%)

There will be weekly WileyPLUS homework assignments due during the term, worth a total of 20% of the final grade. Unless prior arrangements have been made with the instructor, late homework will not be accepted and will thus receive a mark of 0.

### Quizzes (20%)

There will be weekly quizzes during the term, worth 20% of the final mark. Questions on the quizzes will be similar to the homework problems, thus completing the homework should guarantee good quiz results. Missed quizzes cannot be made up (unless prior arrangements have been made with the instructor).

### Midterm Test (25%)

There will be one midterm test worth 25% of the final mark.

### Final Examination (35%)

The final examination will cover the entire course and is worth 35% of the final mark. It will be held at the end of the term during the exam period. The exact date of the exam will be announced as soon as it is set by the School of Science. **A minimum mark of 50% on the final exam is required in order to pass the course.**

## COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

## TEXTBOOKS & LEARNING MATERIALS

- Anton H, Bivens I, Davis S. *Calculus: Single Variable*. 11th Edition. New York: Wiley, 2016.
- WileyPLUS access
- Non-graphing scientific calculator

## ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

## ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations by contacting the Learning Assistance Centre (LAC): LearningAssistanceCentre@yukonu.ca.

**TOPIC OUTLINE**

| Week | Content (numbers refer to textbook sections) |
|---|---|
| 1 | Review: Functions, transformations, and graphing (Appendices B–E, Web Appendices F–H) |
| 2 | Limits of algebraic functions (1.1–1.3) |
| 3 | Continuity (1.5); Continuity of trigonometric functions (1.6) |
| 4 | Differentiation (2.1–2.3) |
| 5 | Differentiation cont'd (2.4–2.6) |
| 6 | Differentiation cont'd (2.7–2.8) |
| 7 | Analysis of functions and their graphs (3.1–3.2) |
| 8 | Analysis of functions and their graphs cont'd (3.3); **MIDTERM** |
| 9 | Applications of the derivative (3.4, 3.5) |
| 10 | Integration (4.1–4.3) |
| 11 | Integration cont'd (4.5, 4.6, 4.9) |
| 12 | Applications of integration (5.1–5.2) |
| 13 | Applications of integration cont'd (5.3-5.5) |
| 14 | Review |

Specific dates of topic coverage and assessments may be subject to change.