

COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/math.html>

*Please note: the College electronically stores this outline for five (5) years only.
 It is **strongly recommended** you keep a copy of this outline with your academic records.
 You will need this outline for any future application/s for transfer credit/s to other colleges/universities.*

1. Instructor Information

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| (a) | Instructor: | Fabrizio Donzelli |
| (b) | Office Hours: | Tuesdays, by appointment (office hours will change beginning in May) |
| (c) | Phone: | 250-721-7458 |
| (d) | Email: | DonzelliF@camosun.bc.ca |
| (e) | Website: | All the course material will be posted on D2L: https://online.camosun.ca/ |

The best way to schedule an appointment is to contact me via email, or talk to me before/after the lecture.

2. Intended Learning Outcomes

The Intended Learning Outcomes for this course, as approved by the Education Council, are as follows. Upon completion of this course the student will be able to:

1. Find the limit of elementary functions as the independent variable approaches some finite value or approaches infinity.
2. Define continuity.
3. Find the derivative of simple functions using the definition.
4. Find the derivative of functions (polynomial, trigonometric, logarithmic and exponential functions) using the product, quotient and chain rule.
5. Find the derivative using implicit differentiation.
6. Solve problems involving rates of change.
7. Find relative and absolute extrema of functions.
8. Sketch graphs of functions identifying such features as relative extrema, intervals where the function is increasing and decreasing, points of inflection, intervals where the function is concave up and concave down, and asymptotes.
9. Solve problems that involve maximizing or minimizing some variable associated with the problem.
10. Solve equations using Newton's method.
11. Find the area under a curve using the limit of the area of a set of approximating rectangles.
12. Evaluate a definite and an indefinite integral of polynomial, trigonometric, logarithmic and exponential functions using the Fundamental theorem of Calculus.
13. Use the Mean Value Theorem of integrals to find the mean value of a continuous function.
14. Evaluate integrals using the method of substitution.
15. Evaluate definite integrals using the trapezoidal rule and Simpson's rule.
16. Solve elementary differential equations using the method of separation of variables.

3. Required Materials

Textbook: Ron Larson and Bruce H. Edwards, *Calculus of a Single Variable*, 10th Edition, Brooks/Cole, 2014. (Previous editions of the textbook may be used without difficulty; however, we will officially be utilizing the 10th edition.)

Calculator: Scientific calculators that are not graphic and do not compute derivative or integrals will be allowed. Examples of such calculators are: Sharp EL-531 or EL-510R scientific calculators. Unauthorized calculators will be confiscated before the beginning of a quiz or test. If you want to have confirmation that your calculator will be allowed, please consult me about a week before the test or exam.

4. Course Content and Schedule

- P. Preparation for Calculus**
 - P.1 Graphs and Models
 - P.2 Linear Models and Rates of Change
 - P.3 Functions and Their Graphs

- 1. Limits and Their Properties**
 - 1.1 A Preview of Calculus
 - 1.2 Finding Limits Graphically and Numerically
 - 1.3 Evaluating Limits Analytically
 - 1.4 Continuity and One-Sided Limits
 - 1.5 Infinite Limits

- 2. Differentiation**
 - 2.1 The Derivative and the Tangent Line Problem
 - 2.2 Basic Differentiation Rules and Rates of Change
 - 2.3 Product and Quotient Rules and Higher-Order Derivatives
 - 2.4 The Chain Rule
 - 2.5 Implicit Differentiation
 - 2.6 Related Rates

- 3. Applications of Differentiation**
 - 3.1 Extrema on an Interval
 - 3.2 Rolle's Theorem and the Mean Value Theorem
 - 3.3 Increasing and Decreasing Functions and the First Derivative Test
 - 3.4 Concavity and the Second Derivative Test
 - 3.5 Limits at Infinity
 - 3.6 A Summary of Curve Sketching
 - 3.7 Optimization Problems
 - 3.8 Newton's Method
 - 3.9 Differentials

- 4. Integration**
 - 4.1 Antiderivatives and Indefinite Integration
 - 4.2 Area
 - 4.3 Riemann Sums and Definite Integrals
 - 4.4 The Fundamental Theorem of Calculus
 - 4.5 Integration by Substitution
 - 4.6 Numerical Integration

- 5. Logarithmic, Exponential, and Other Transcendental Functions**
 - 5.1 The Natural Logarithmic Function: Differentiation
 - 5.2 The Natural Logarithmic Function: Integration
 - 5.3 Inverse Functions
 - 5.4 Exponential Functions: Differentiation and Integration
 - 5.5 Bases Other Than e and Applications

- 6. Differential Equations**
 - 6.2 Differential Equations: Growth and Decay
 - 6.3 Separation of Variables and the Logistic Equation

5. Basis of Student Assessment (Weighting)

The final grade will be calculated based upon the following breakdown:

| | |
|-----------------------------|------------|
| Assignments/Quizzes: | 10% |
| Term Tests: | 40% |
| Comprehensive Final: | 50% |

Assignments/Quizzes: Homework will be assigned weekly. There will be a total of 4 take-home assignments. The lowest assignment mark will be dropped from calculating the assignment average. This allows you to miss one assignment without penalty. Occasionally, depending on the time available, there will be a short quiz (1-2 questions) before the beginning of the lecture. The drop policy for the lowest quiz mark will be determined during the semester.

Late Policy: You will be given ample time (about a week) to complete the assignments, which will be collected in class before the beginning of the lecture. Late assignments will incur a 20% penalty, until the solutions are posted. At this point, late assignments will not be accepted. **Please note that you will not be allowed to work on the assignment during the lecture.**

Make-up exams and contesting the grade: There are no make-up tests. If you miss a test due to illness or family emergency you will be given an exemption from it provided you notify me as soon as possible and provide

supporting documentation (such as from a doctor or counselor). In the event that you are given an exemption from a test, your performance on the other tests, not including the final examination, will be used to compute a numerical score for the missed test. **You have one week starting from the day the test is returned to contest your grade:** after one week, the grade will become definitive and no changes will be allowed. This rule is meant to encourage you to review your work when your memory is still fresh.

Final Exam: The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, "students are expected to write tests and final examinations at the scheduled time and place." Exceptions will only be considered due to special circumstances as outlined in the calendar. The calendar specifically states that "holidays or scheduled flights are not considered to be emergencies."

Collaboration: Students are very much encouraged to collaborate on homework and assignments. However, you must be prepared to answer similar questions on your own for the tests and quizzes. I recommend discussing the questions with your peers, but writing your final solutions on your own, to ensure you are familiar with the material.

6. Grading System

Standard Grading System (GPA)

| Percentage | Grade | Description | Grade Point Equivalency |
|------------|-------|---|-------------------------|
| 90-100 | A+ | | 9 |
| 85-89 | A | | 8 |
| 80-84 | A- | | 7 |
| 77-79 | B+ | | 6 |
| 73-76 | B | | 5 |
| 70-72 | B- | | 4 |
| 65-69 | C+ | | 3 |
| 60-64 | C | | 2 |
| 50-59 | D | Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite. | 1 |
| 0-49 | F | Minimum level has not been achieved. | 0 |

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

| Temporary Grade | Description |
|-----------------|--|
| I | <i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family. |
| IP | <i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. (For these courses a final grade will be assigned to either the 3 rd course attempt or at the point of course completion.) |
| CW | <i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement. |

There is a Student Conduct Policy which includes plagiarism.

It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.