



COURSE OUTLINE

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

Ω 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: | Gilles Cazalais |
| (b) | Office Hours: | http://pages.pacificcoast.net/~cazalais/schedule.html |
| (c) | Location: | CBA 158 |
| (d) | Phone: | 370-4495 |
| (e) | Email: | Cazalais@camosun.bc.ca |
| (f) | Website: | http://pages.pacificcoast.net/~cazalais/250b.html |

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

Upon completion of this course the student will be able to:

1. Sketch the graph of a function of two variables using contours.
2. Evaluate limits and justify why a limit might not exist.
3. Use differentials to do computations in linear approximation and error analysis.
4. Calculate derivatives using the chain rule for functions of several variables.
5. Calculate partial derivatives implicitly.
6. Solve optimization problems using directional derivatives.
7. Find equations of tangent planes and normal lines to surfaces.
8. Find the relative extrema of a function of several variables.
9. Use the second partials test to determine the nature of relative extrema of a function of two variables.
10. Perform calculations involving the method of least squares.
11. Solve constrained optimization problems using the Lagrange Multiplier method.
12. Evaluate a double integral as an iterated integral.
13. Calculate the area of a plane region and the volume of a solid region using a double integral.
14. Evaluate double integrals in polar coordinates.
15. Calculate the mass, centre of mass and moments of inertia of a planar lamina using double integrals.
16. Find the area of the surface of a solid using a double integral.
17. Find the volume, mass, centre of mass and moments of inertia of a solid region using a triple integral.
18. Evaluate triple integrals in cylindrical or spherical coordinates.
19. Use a Jacobian to change variables in a double or a triple integral.
20. Calculate the curl and the divergence of a vector field.
21. Determine whether a vector field is conservative.
22. Evaluate a line integral, a line integral of a vector field and a line integral in differential form.
23. Perform calculations involving the Fundamental Theorem of line integrals, the concept of independent of path and of conservation of energy.
24. Use Green's Theorem to evaluate a line integral.
25. Represent a surface using a set of parametric equations.
26. Find a normal vector and a tangent plane to a parametric surface and calculate the area of a parametric surface.
27. Evaluate a surface integral as a double integral.
28. Evaluate a surface integral for a parametric surface.
29. Perform calculations using the Divergence Theorem and Stoke Theorem.

3. Required Materials

Edwards and Penney, *Calculus Early Transcendentals*, 7th edition.

4. Course Content

1. Partial Differentiation

- Introduction (12.1)
- Cylinders and Quadric Surfaces (11.7)
- Functions of Several Variables (12.2)
- Limits and Continuity (12.3)
- Partial Derivatives (12.4)
- Multivariable Optimization Problems (12.5)
- Increments and Linear Approximations (12.6)
- The Multivariable Chain Rule (12.7)
- Directional Derivatives and the Gradient Vector (12.8)
- Lagrange Multipliers and Constrained Optimization (12.9)
- Critical Points of Functions of Two Variables (12.10)

2. Multiple Integrals

- Double Integrals (13.1)
- Double Integrals over more general regions (13.2)
- Area and Volume by Double Integration (13.3)
- Double Integrals in Polar Coordinates (13.4)
- Applications of Double Integrals (13.5)
- Triple Integrals (13.6)
- Cylindrical and Spherical Coordinates (11.8)
- Integration by Cylindrical and Spherical Coordinates (13.7)
- Surface Area (13.8)
- Change of Variables in Multiple Integrals (13.9)

3. Vector Calculus

- Vector Fields (14.1)
- Line Integrals (14.2)
- The Fundamental Theorem and Independence of Path (14.3)
- Green's Theorem (14.4)
- Surface Integrals (14.5)
- The Divergence Theorem (14.6)
- Stokes' Theorem (14.7)

5. Basis of Student Assessment (Weighting)

- Three tests: 50%
- Comprehensive Final Exam: 50%

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

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. <i>(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)</i> |
| 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. |

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

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.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED