

# MATH 317: Calculus IV (Fall 2023)

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**Description:** In this course we study the calculus of vector-valued functions of several variables. We will study parametrization, differentiation and integration, length and area on curves and surfaces. We will study vector fields and their operations grad, div, and curl. We will study integral theorems of Green, Gauss, and Stokes for vector fields.

**Topics:**

- Curves and curvature in two dimensions
- Curves in three dimensions and Frenet-Serret frame
- Vector fields and field lines
- Theory of conservative vector fields
- Line integrals
- Green's theorem
- Surfaces and tangent planes
- Surface integrals
- Gradient, divergence, and curl
- Divergence theorem
- Stokes's theorem
- Maxwell's equations

**Prerequisites:** One of MATH 200, MATH 226, MATH 253. MATH 221 is recommended.

**Textbook:** CLP-4 Vector Calculus by Feldman, Rechnitzer and Yeager. Available online at <https://www.math.ubc.ca/~CLP/CLP4/>.

**Sections:** Instructor: Sébastien Picard

MWF 10-11am in MATH 100

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**Homework:** There will be problem sets due every other week on Fridays. Homework will be typed or scanned and submitted on the Canvas page. You are encouraged to work in groups on the homework, however you must write up your own solutions. The lowest homework score will be dropped.

**Quizzes:** On weeks when no homework is due, there will be a short quiz to be completed on the Canvas page. The lowest quiz score will be dropped.

**Midterm:** There will be an in-class midterm exam held on October 20.

**Final Exam:** There will be a cumulative final exam scheduled during the UBC examination period.

**Grading Scheme:** Homework 15%, Quizzes 15%, Midterm 20%, Final 50%

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### Course Policies:

- **Missing/late homework and quizzes:** No late homework or quiz will be accepted. You can receive one concession during the term by submitting a Department of Mathematics self-declaration form (which can be found [here](#)). The weight of the missed homework/quiz with accepted concession form will be transferred to the other assignments. More information on UBC's policy for academic concessions can be found [here](#).

- **Missing midterms:** There are no make-up tests in this course. A student who misses a midterm for a valid reason must present to their instructor a Department of Mathematics self-declaration form, and the weight of the assessment will be transferred to the final exam. More information on UBC's Academic Concession Policy can be found [here](#).

- **Missing the Final Exam:** You will need to present your situation to the Dean's Office of your Faculty to be considered for a deferred exam.