

# MATH 317: Calculus IV (Term 2, 2021)

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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

**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:**

- 317:201 MWF 2-3pm Sébastien Picard (spicard at math.ubc.ca)
- 317:202 MWF 12-1pm Jongchon Kim (jkim at math.ubc.ca)

**Course Structure:** Lectures will be held on Zoom. The Zoom links will be accessed through the Canvas section page. Lectures will be recorded and posted on Canvas.

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**Homework:** There will be problem sets due every other week on Mondays. Homework will be typed or scanned and submitted on the Canvas page MATH 317 ALL. 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 MATH 317 ALL. The lowest quiz score will be dropped.

**Midterm:** There will be a midterm exam held on March 1. The midterm will be 90min long and available during a 24h window. The midterm exam will be open-book, however you may not communicate with anyone while taking the midterm.

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

**Grading Scheme:** Homework 20%, Quizzes 15%, Midterm 20%, Final 45%

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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.