

# Course Syllabus

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MATH 317 (3 credits), Calculus IV, University of British Columbia  
2022 Winter Term 1 (September - December 2022)

## Description

In this course we study the calculus of vector-valued functions of one or 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 finally study integral theorems of Green, Gauss, and Stokes for vector fields.

## Prerequisite

Calculus III: One of MATH 200, MATH 226, MATH 253 is required.  
(Linear algebra: One of MATH 152, MATH 221, MATH 223 is recommended.)

## Textbook

[CLP-4 Vector Calculus \(https://personal.math.ubc.ca/~CLP/CLP4/\)](https://personal.math.ubc.ca/~CLP/CLP4/), by Feldman, Rechnitzer and Yeager

## Topics

1. Curves (1.1-1.6, 6hr)  
vector functions and space curves, derivatives and integrals of vector functions, arc length and curvature, velocity and acceleration
2. Vector fields (2.1-2.4, 9hr)  
vector fields, line integrals and its fundamental theorem, conservative vector fields
3. Surface integrals (3.1-3.5, 9hr)  
parametric surfaces and their areas, surface integrals
4. Integral theorems (4.1-4.4, 9hr)  
curl and divergence, divergence theorem, Green's theorem, Stokes' theorem

## Important Dates

- First day of class: Wednesday, Sept. 7
- Last day to withdraw without record: Monday, Sept. 19
- Midterm 1: Wednesday, Oct. 12
- Midterm 2: Wednesday, Nov. 16

- Last day of classes: Wednesday, Dec. 7
- Final exam: TBD

## Grading

1. Weekly homework (10%) due Wednesdays Sep 21, 28, Oct 5, 19, 26, Nov 2, 9, 23, 30 and Dec 7 at 11:59pm on Canvas, with the lowest score dropped;
2. Two 50-minute midterm exams (20% each) on Wednesdays October 12 and November 16, in class. MT2 is non-accumulative;
3. One 150-minute final exam (50%). The final exam is accumulative and covers all topics.

## Canvas

1. Canvas is UBC's mobile-friendly online learning platform.
2. You can log in Canvas with your CWL id.
3. Announcements, assignments, practice exams and exam solutions will be all posted in Canvas.
4. You will take photo or scan your assignments and upload them to Canvas.

## Piazza

We will have a forum at Piazza (see link on the sidebar). You can ask and answer questions there. It is more efficient than emailing questions to the instructors since many students will have similar questions, the answers from your classmates may be easier to understand, and the process of discussion is also beneficial. Instructor and TA will occasionally check if there are questions unanswered.

## Policies on homework and midterms

1. No calculators or notes are allowed in the midterm and final exams.
2. Homework assignments are due 11:59pm at Canvas on Wednesdays. Solutions will be posted on Canvas. A selection of the problems will be graded. If you submit homework late, a 25% penalty will be applied for each day late.
3. Permission to shift the weight of your missed midterms to other exams, or to ignore missed assignments, may be granted only in the following circumstances:
  - i. prior notice of a valid, documented absence on the scheduled date (e.g. out-of-town varsity athletic commitment with a letter from a coach),
  - ii. notification to the instructor of absence due to a medical condition with a doctor's note, or
  - iii. inability to return to campus due to Covid-19 travel restrictions, with a proof.

Otherwise, a score of 0 will be given for the missed midterms/assignments. However, the [UBC policy on Academic Concession \(http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0\)](http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0) allows students to request academic concession without documentations ONCE per course. For such request please fill the [form \(http://www.math.ubc.ca/Ugrad/ugradForm/Student\\_Declaration\\_Academic\\_Concession\\_MATH.pdf\)](http://www.math.ubc.ca/Ugrad/ugradForm/Student_Declaration_Academic_Concession_MATH.pdf)

4. The period for final exams is December 11-22, 2022 inclusive. The exact time will be announced by the University in the middle of the term. Students should not make early travel plans that overlap with the scheduled exam period.

## Statement on UBC's Policies and Resources to Support Student Success

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available [here](https://senate.ubc.ca/policies-resources-support-student-success) (<https://senate.ubc.ca/policies-resources-support-student-success>).




### Additional Resources:

- Math Learning Centre (MLC): Teaching Assistants are available to answer questions at the [Math Learning Center](https://www.math.ubc.ca/~MLC/) (<https://www.math.ubc.ca/~MLC/>) located in LSK 301/302.
- Math department [past exams](https://secure.math.ubc.ca/Ugrad/pastExams/) (<https://secure.math.ubc.ca/Ugrad/pastExams/>).

### Instructor

1. Tai-Peng Tsai, Math building room 109, phone 604-822-2591, [ttsai@math.ubc.ca](mailto:ttsai@math.ubc.ca)
2. office hours: Mon 11am, Tue Wed 2-2:50pm, and by appointments.

### Course Summary:

Date	Details	Due
Wed Sep 21, 2022	 <a href="#">Homework 1</a> ( <a href="https://canvas.ubc.ca/courses/103720/assignments/1338419">https://canvas.ubc.ca/courses/103720/assignments/1338419</a> )	due by 11:59pm
Wed Sep 28, 2022	 <a href="#">Homework 2</a> ( <a href="https://canvas.ubc.ca/courses/103720/assignments/1338420">https://canvas.ubc.ca/courses/103720/assignments/1338420</a> )	due by 11:59pm
Wed Oct 5, 2022	 <a href="#">Homework 3</a> ( <a href="https://canvas.ubc.ca/courses/103720/assignments/1338421">https://canvas.ubc.ca/courses/103720/assignments/1338421</a> )	due by 11:59pm

Date	Details	Due
Wed Oct 12, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338429">MT1 (https://canvas.ubc.ca/courses/103720/assignments/1338429)</a>	due by 10:50am
Wed Oct 19, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338422">Homework 4 (https://canvas.ubc.ca/courses/103720/assignments/1338422)</a>	due by 11:59pm
Wed Oct 26, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338423">Homework 5 (https://canvas.ubc.ca/courses/103720/assignments/1338423)</a>	due by 11:59pm
Wed Nov 2, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338424">Homework 6 (https://canvas.ubc.ca/courses/103720/assignments/1338424)</a>	due by 11:59pm
Wed Nov 9, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338425">Homework 7 (https://canvas.ubc.ca/courses/103720/assignments/1338425)</a>	due by 11:59pm
Wed Nov 16, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338428">MT 2 (https://canvas.ubc.ca/courses/103720/assignments/1338428)</a>	due by 10:50am
Wed Nov 23, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338426">Homework 8 (https://canvas.ubc.ca/courses/103720/assignments/1338426)</a>	due by 11:59pm
Wed Nov 30, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1338427">Homework 9 (https://canvas.ubc.ca/courses/103720/assignments/1338427)</a>	due by 11:59pm
Wed Dec 7, 2022	 <a href="https://canvas.ubc.ca/courses/103720/assignments/1339213">Homework 10 (https://canvas.ubc.ca/courses/103720/assignments/1339213)</a>	due by 11:59pm