MATH 217 101 2022W1 Multivariable and Vector Calculus

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MATH 217 Multivariable and Vector Calculus

Contact info:

- Instructor: Prof. Kai Behrend, behrend@math.ubc.ca (mailto:behrend@math.ubc.ca)
- Teaching Assistant: Alan Getz, agetz@math.ubc.ca (mailto:agetz@math.ubc.ca)

Course Structure:

This course will be taught in-person, with lectures scheduled as follows:

- Tuesday and Thursdays, 9:30 am to 11:00 am, WESB 201.
- Wednesdays, 11:00 am to 12:00 pm. ESB 1012.
- Instructor office hours: TBD.
- TA office hours: TBD.

Learning Materials:

- Main Text: CLP-3 Multivariable Calculus Textbook and CLP-4 Vector Calculus Textbook by Joel Feldman, Andrew Rechnitzer, and Elyse Yeager. These locally developed texts are available here (http://www.math.ubc.ca/~CLP) . The companion Problem Books (draft versions) to these texts, available at the same site, will also be useful.
- Lecture notes will be posted under "Pages"
- Lecture notes from previous years of Math 217 at UBC are under "Pages"-->"Bryan's Notes"
- I will post practice midterms and finals before each midterm and final under "Pages"
- Piazza: Access our course Piazza page from Canvas. Alan and I will answer questions there.

Webwork

Weekly webwork assignments will appear on the Assignments tab in Canvas. Assignments due dates vary.

Always access the webwork assignment through the link in Canvas (otherwise the grades don't sync correctly).

Assessment of Learning:

There will be weekly webwork assigned as well as two midterms. The course grade will normally be

given by the *better* of the following two schemes:

- 50% Final Exam + 35% Midterm grades + 15% WebWork Grade, or
- Scaled Final Exam grade - 10

Please note that grades may be scaled.

Course Policies:

- There will be two midterm exams. There are no make-up midterms. Missing a midterm for a valid reason normally results in the weight of that midterm being re-distributed to the remaining midterm and final exam. Any student who misses a midterm is to present the **Department of Mathematics self-declaration form (https://owncloud.math.ubc.ca/index.php/s/mumsWsljdjR1idJ#pdfviewer)** for reporting a missed assessment to their instructor within 72 hours of the midterm date. This policy conforms with the UBC Vancouver Senate's Academic Concession Policy V-135 and students are advised to read this policy carefully.
- **General Information (https://www.math.ubc.ca/general-syllabus-information)**

Learning outcomes:

Here is a list of learning outcomes: **skills.pdf** (https://canvas.ubc.ca/courses/103687/files/22286559/download?download_frd=1)

Schedule of Topics:

Here is our expected progress through the course laid out in weeks. A week is roughly 4 lecture hours. Corresponding sections of the texts are listed.

Week 0 (Sept 6-8): coordinates, vectors, dot and cross products, lines and planes (CLP3: 1.1-1.5)

Week 1 (Sept 13-15): curves, tangents, arc length, sketching surfaces, (CLP3: 1.6-1.9)

Week 2 (Sept 20-22): functions of several variables, partial derivatives, higher-order derivatives, equality of mixed partials (CLP3: 2.1-2.3), tangent planes and linear approximation (CLP 2.5, 2.6), chain rule (CLP3: 2.4);

Week 3 (Sept 27-Sept 29): directional derivatives and the gradient (CLP3: 2.5-2.7), classification of critical points (CLP 2.9)

Week 4 (Oct 4-6): maxima and minima, Lagrange multipliers (CLP3: 2.9-2.10)

Week 5 (Oct 11- 13): double integrals, volumes, double integrals in polar coordinates (CLP3: 3.1-3.2);

Midterm 1 in class on October 13.

Week 6 (Oct 18-20): applications of double integrals, triple integrals, triple integrals in cylindrical and spherical coordinates (CLP3: 3.3-3.7)

Week 7 (Oct 25-27): vector fields, line integrals, path independence (CLP4: 2.1-2.4, 1.6);

Week 8 (Nov 1-3): parameterized surfaces, surface integrals (CLP4: 3.1-3.5)

Week 9 (Nov 8): surface integrals continued.

Week 10 (Nov 15th-17th): gradient, divergence, curl (CLP4: 4.1);

Midterm 2 in class Nov 17th.

Week 11 (Nov 22 - 24): the divergence theorem, Green's theorem, Stokes' theorem (CLP4: 4.2,4.3, 4.4)

Week 12 (Nov 29 -Dec 1): Differential Forms (CLP4: 4.7)

Week 13 (Dec 6-7): overflow and review

Final exam: to be scheduled by the university