MATH_V 217 101 2024W1 Multivariable and Vector Calculus

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MATH 217 Multivariable and Vector Calculus

Contact info:

- Instructor: Prof. Jim Bryan, jbryan@math.ubc.ca
- Teaching Assistant: Nicolas Morales Preciado, nicolasmp95@math.ubc.ca

Course Structure:

Lectures will be live:

- Tuesday and Thursdays, 9:30 am to 11:00 am. Blackboard lecture live from IRC Floor B1 room 1.
- Wednesdays, 11:00 am to 12:00 pm. Blackboard lecture live from IRC Floor B1 room 1.
- Office hours: Fridays 11:00am-noon in Math 226.
- TA Office hours: Wednesday 12:30pm -- 1:30pm in AUDX 124

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. The companion Problem Books (draft versions) to these texts, available at the same site, will also be useful.
- I will post my lecture notes under "pages"-->"notes"
- I will post practice midterms and finals before each midterm and final.
- Piazza: Access our course Piazza page from Canvas. The TA and I will answer questions there.

Webwork

Weekly webwork assignments will appear on the Assignments tab in Canvas. Assignments are due on Tuesdays at midnight. **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 at least two midterms (I am currently planning on two midterms, but this may change). 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 (at least) two midterms during the term. 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 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.

Learning outcomes:

Here is a list of learning outcomes: _skills.pdf

Download skills.pdf

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.

Weeks 0 and 1 (Sept 3th-12th): Intro, coordinates, vectors, dot and cross products, lines and planes (CLP3: 1.1-1.5)

Week 2 (Sept 17th-19th): curves, tangents, arc length, sketching surfaces, (CLP3: 1.6-1.9)

Week 3 (Sept 24th-Sept 26th): 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 4 (Oct 1st-3rd): directional derivatives and the gradient (CLP3: 2.5-2.7), classification of critical points (CLP 2.9)

Week 5 (Oct 8th-10th): maxima and minima, Lagrange multipliers (CLP3: 2.9-2.10);

Week 6 (Oct 15th-17th): double integrals, volumes, double integrals in polar coordinates (CLP3: 3.1-3.2); **First midterm in class on October 17th.**

Week 7 (Oct 22nd-24th): applications of double integrals, triple integrals, triple integrals in cylindrical and spherical coordinates (CLP3: 3.3-3.7)

Week 8 (Oct 29th-31st): vector fields, line integrals, path independence (CLP4: 2.1-2.4, 1.6);

Week 9 (Nov 5th - 7th): parameterized surfaces, surface integrals (CLP4: 3.1-3.5)

Week 10 (Nov 14th): **(Reading week)** surface integrals continued.

Week 11 (Nov 19th - 21st): gradient, divergence, curl (CLP4: 4.1); **Second midterm in class Nov 21st.**

Week 12 (Nov 26th -Nov 28th): the divergence theorem, Green's theorem, Stokes' theorem (CLP4: 4.2,4.3, 4.4)

Week 13 (Dec 3th -Dec 5th): Differential Forms (CLP4: 4.7); review