Math 441: Multi-Variable Calculus

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Course Description

Students will apply and extend their knowledge of calculus to problems involving several variables. They will examine the similarities and differences between single and several variable situations from computational, geometrical, and theoretical points of view. The course covers the material from a traditional semester-long university course: geometry and algebra of vectors, coordinate systems, functions of several variables and their graphs and behaviors, differentiation (partial derivatives, gradients, divergence, curl, etc.), and integration (multiple integrals, path, line, and surface integrals). Other topics include applications (min/max problems, work, flux, etc.), Change-of-Variables Theorem, Green's Theorem, Stokes' Theorem, and Gauss' Theorem.

Required Materials

- Text: Colley, Susan J. (2003). *Vector Calculus*, 4th ed. Pearson.

- Access to Google Classroom: course code **xabovpf**.

Course Structure

Class Structure/Course Expectations

This course will be taught similar to a university-level mathematics course. Homework assignments will be given weekly, and often assessed via short (15-30 minute) quizzes. It is up to the students to determine if additional practice is necessary to be prepared for exams. It is an expectation that students are taking detailed notes and reading in the text to remain fully comfortable with the material.

Assessments

Homework will be given weekly, consisting of problems from the text and occasional supplemental problems. Students are expected to use precise mathematical language and reasoning. In a typical week, the homework will not be collected; instead, on the given due date, we will have a closed-note quiz where students will complete a selection of their assigned problems. If there is no homework quiz, students will be notified and the instructor will collect the homework and grade a selection of the problems for a grade. The lowest homework grade will be dropped. Therefore, **no late homework will be accepted**. Homework assignments will be posted on Google Classroom.

For each unit, there will be approximately 1-2 Take-Homes. Take-Homes are 1-3 question assignments that will be more challenging. Students will be given at least one week to complete

them and all problems will be graded. These questions will not show up on a homework quiz. Again, **no late work will be accepted**. All assignments will be posted on Google Classroom, it is up to the students to set aside enough time to complete them.

There will be approximately one exam for each unit. Exams will be announced at least a week ahead of time. There are no retakes for any exams.

Final Exam

The final exam will be on **Tuesday, May 26, 2020**.

Grading Policy

Your semester grade will be calculated under the following guidelines, the quarter grade percentages are given in the parenthesis. Your lowest homework grade will be dropped.

- **15%** of your grade will be determined by weekly homework quizzes (20% for Q3).
- **10%** of your grade will be determined by Take-Homes (13% for Q3)
- **50%** of your grade will be determined by exams (67% for Q3)
- **25%** of your grade will be determined by the final exam.

Course Policies

During Class

Unless instructed otherwise, please refrain from using cell phones, laptops, or listening to music during class as it hinders the learning of you and the students around you.

Policies on Late Assignments

Late work is not accepted in this class, as it is rarely accepted at the university level. Please check Google Classroom for the most recent updates.

Schedule and weekly learning goals

The course will be broken down into seven units. These units are not finalized and are subject to change:

Unit 1: Vectors

Unit 2: Functions, Limits, Differentiability, Partial and Directional Derivatives

Unit 3: Taylor Series, Differentials, Optimization

Unit 4: Iterated Integrals, Change of Variables

Unit 5: Vector Fields, Line Integrals, Green's Theorem

Unit 6: Surface Integrals, Stokes' Theorem, Gauss' Theorem

Disclaimer

The instructor reserves the right to make changes to the syllabus. Please consult Google Classroom for any updates.