

Calculus 3

Math 264

Mychael Smith

Instructor Information
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Office Hours
TW 9:00AM to 12:00PM
In STEM: W 12:00PM to 1:00PM
Or by appointment

1 Overview

Welcome to Math 264. Here is the UNM course description.

Vector operations, vector representation of planes and curves, functions of several variables, partial derivatives, gradient, tangent planes, optimization, multiple integrals in Cartesian cylindrical and spherical coordinates, vector fields, line integrals and Green's theorem.

Prerequisite: C or better in 163.

2 Course Learning Outcomes

1. Vectors in 3-dimensional space
 - (a) Use vector notation correctly.
 - (b) Perform vector operations, including dot product, cross product, differentiation and integration, and demonstrate their geometric interpretations.
 - (c) Perform operations on vector valued functions and functions of a parameter.
2. Functions of multiple variables
 - (a) Identify and graph the equations of cylinders and quadratic surfaces in 3-dimensional space.
 - (b) Determine the domain of continuity of a vector valued function and of a function of multiple variables.
3. Applications of differentiation
 - (a) Compute partial derivatives, generally and at a point, and sketch their graphical representation on a surface in space.
 - (b) Recognize when the chain rule is needed when differentiating functions of multiple variables, parametric equations and vector valued functions, and be able to use the chain rule in these situations.
 - (c) Compute curvature of a parameterized vector representation of a curve in 2- and 3-dimensional space and be able to explain its meaning.
 - (d) Compute the unit tangent and unit normal vectors to a curve and be able to sketch them with the curve.
 - (e) Computationally move among position vector, velocity vector, speed, and acceleration vectors; recognize and demonstrate their use as applied to motion in space.
 - (f) Determine the equation of the tangent plane to a surface at a point.
 - (g) Use the tangent plane to a surface to approximate values on the surface and estimate error in approximation using differentials.

- (h) Compute directional derivatives and represent them graphically relative to the inherent surface.
 - (i) Compute the gradient vector; represent it graphically relative to the inherent surface and use it to maximize or minimize rate of change of the function.
 - (j) Locate local and global maxima and minima of a function.
 - (k) Use Lagrange multipliers to maximize output with one or two constraints.
4. Application of Integration
- (a) Compute arc length and be able to explain its derivation as a limit.
 - (b) Calculate double and triple integrals independently and with their geometric representations as surfaces, areas and volumes.
 - (c) Calculate iterated integrals in polar, cylindrical and spherical coordinate systems.

3 Required Text

The required text for this course is:

- Calculus, by Thomas, 14th edition.

4 Attendance Policy

Attendance in the course is required. If a student misses two classes in the first two weeks of the semester, three consecutive class periods or five total, I reserve the right (but not the obligation) to drop the student from the class. If you stop attending class for any reason, it is your responsibility to make sure you dropped the class, or risk getting a failing grade.

5 Course Structure

Homework will be based on the following.

- In-class worksheets and written homework (50 points)
 - We will be doing in-class worksheets this semester in groups. I will be grading these based off of participation and completion. This means interacting with your group members and having positive discussions.
- Written homework (50 points)
 - Keep your written homework neatly organized in a notebook or folder. I will be checking it on exam days for organization and effort. Each exam day, I will give a score out of 12.5 points for your homework. **Do not forget your homework folder on exam days.**
- Quizzes (100 points)
 - We will be doing 12 quizzes in class for 10 points each. I will drop the lowest two scores for a total of 100 points. The quizzes will resemble the midterm and final, so they will be good study aides.
- Three Midterms (100 points each)
 - The midterm will cover the first half of the class and will be good practice for the final exam.
- Final (200 points)
 - The final exam will be comprehensive.
- Total (700 points)

6 Grading Policy

Your grades will be calculated as follows.

Point Total	Grade
[686,700]	A+
[644, 686)	A
[630,644)	A-
[616,630)	B+
[574,616)	B
[560,574)	B-
[546,560)	C+
[490,546)	C
[476,490)	D+
[434,476)	D
[420,434)	D-
[0,420)	F

7 Make-up Policy

I will allow up to four late submissions of homework assignments.

8 Schedule

- Week 1 (12.1-12.3)
 - 3-D space, vectors, and dot products
- Week 2 (12.4-12.5)
 - Cross products, lines
 - Quiz 1: Jan 22
- Week 3 (12.5-12.6)
 - Planes, cylinders, quadric surfaces.
 - Quiz 2: Jan 29
- Week 4 (13.1-13.2)
 - Exam 1: Feb 5th
 - Vector valued functions
- Week 5 (13.3-13.6)
 - Quiz 3: Feb 12
 - Arc Length, curvature, and motion in space
- Week 6 (14.1-14.3)
 - Quiz 4: Feb 19
 - Functions of several variables, limits, partial derivatives
- Week 7 (14.4-14.5)

- Quiz 5: Feb 26
- Chain rule, directional derivatives
- Week 8 (14.6 cont.)
 - Quiz 6: Mar 5
 - Linear Approximation, and review for Exam 2.
 - Exam 2: Mar 7
- Week 9
 - Spring Break
- Week 10 (14.7-14.8)
 - Extrema and Saddle Points
 - Quiz 7: Mar 21
- Week 11 (15.1-5.2)
 - Quiz 8: Mar 26
 - Double integrals and iterated integrals
- Week 12 (15.3-15.5)
 - Quiz 9: Apr 2
 - More double integrals, triple integrals
- Week 13 (15.6-15.8)
 - Quiz 10: Apr 9
 - More Triple Integrals and review for Exam 3
- Week 14 (16.1-16.3)
 - Exam 3: Apr 16
 - Vector Fields, Curl and Divergence, Line Integrals
- Week 15 (16.4-16.8)
 - Quiz 11: Apr 23
 - Higher Dimensional Fundamental Theorems of Calculus
- Week 16
 - Quiz 12: Apr 30
 - Review for Final Exam
- Week 17
 - Final Exam: Thursday, May, 9 from 3:00PM to 5:00PM in A141.

9 Important Dates

Date	Event
1/21	Martin Luther King Jr Day
1/25	Last day to add or change credit hours or change grade mode on Loboweb
4/12	Last day to drop without Dean's permission
5/3	Last day to drop with Dean's permission

10 A note on academic integrity

We will follow the university policy on academic integrity listed below.

Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. Here is the link to the UNM Academic Dishonesty Policy: <https://policy.unm.edu/regents-policies/section-4/4-8.html>. The policy states:

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails to meet the expected standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic Dishonesty is defined as: "Academic dishonesty" includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

11 Students with Disabilities

If you have a documented disability, please provide me with a copy of your letter from Equal Access Services as soon as possible to ensure that accommodations are provided in a timely manner.

12 Equal opportunity and non-discrimination

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered "responsible employees" by the Department of Education (see page 15 - <http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf>). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: <https://policy.unm.edu/university-policies/2000/2740.html>.

13 Citizenship and/or Immigration Status:

All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website: <http://undocumented.unm.edu/>.

Note: This syllabus is subject to change, if needed.