

Math 231: Calculus of Several Variables

Instructor : David Shoenthal

Office hours : 2:15 p.m. - 3:30 p.m. MW; 11 a.m. - 12 p.m. F; or by appointment

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Course Description: We will extend the notions of the calculus to explore multivariable calculus. More specifically, we will investigate three-dimensional analytic geometry, vectors in space, and partial differentiation.

Prerequisite: Math 141

Text: Stewart, James. *Calculus 5e*, as well as possible handouts.

SECTION	TOPICS	PERIODS
VECTORS AND THE GEOMETRY OF SPACE		
13.1	Three-Dimensional Coordinate Systems	1
13.2	Vectors	1
13.3	The Dot Product	1
13.4	The Cross Product	1
13.5	Equations of Lines and Planes	2
13.6	Cylinders and Quadric Surfaces	1
13.7	Cylindrical and Spherical Coordinates	1
VECTOR FUNCTIONS		
14.1	Vector Functions and Space Curves	1
14.2	Derivatives and Integrals of Vector Functions	1
14.3	Arc Length and Curvature	2
14.4	Motion in Space: Velocity and Acceleration	1.5
PARTIAL DERIVATIVES		
15.1	Functions of Several Variables	1
15.2	Limits and Continuity	1
15.3	Partial Derivatives	1
15.4	Tangent Planes and Linear Approximations	2
15.5	The Chain Rule	1.5
15.6	Directional Derivatives and the Gradient Vectors	2
15.7	Maximum and Minimum Values	2
15.8	Lagrange Multipliers	2

Calculators: The use of calculators will **not** be permitted on exams.

Grades: Grades will be assigned on the basis of 350 points distributed as follows:

200 points 2 midterm examination (100 points each)

150 points final examination

Exam Dates: The midterms will occur on June 30 and July 21. The final is on August 13. Do not make plans to leave campus before August 14. All times and locations will be announced as the semester progresses.

Makeup Midterm Examination: Students who have a valid, verifiable reason (for example, illness or official University conflict) are permitted to schedule a makeup exam. Students who do not have a valid reason (for example, forgetting the date and/or time of the exam) are also permitted to schedule a makeup, but 20 points on a regular exam or 30 points on a final exam will be deducted from the score. In order to take a makeup examination without penalty, the student must present valid verification of the reason for his/her absence to the instructor.

Academic Integrity Statement: All Penn State Policies regarding ethics and honorable behavior apply to this course. To wit: “Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University’s Code of Conduct states that all students should act with personal integrity, respect other students’ dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.”

Grade Cut-offs: The following is a list of grade cut-offs to help you know where you stand throughout the semester.

A	93 ;	A-	90
B+	87 ;	B	83
B-	80 ;	C+	77
C	70 ;	D	60