Vector Calculus

Course Information
Fall 2017

Course Description

Vector Calculus is applies the techniques of single variable calculus to functions of multiple variables. We begin by studying vectors in two, three, or more dimensions, and learning how to graph in three dimensions. We study maps from one dimensional space into two or three dimensional space; these model the motion of a particle. Next we learn about maps from two or three dimensional space into one dimensional space, and integration of such functions. Then we are ready for the study of vector fields, which attach a vector to each point in a plane or in space. We will study divergence and curl, and (time permitting) will cover Green's Theorem and Stoke's Theorem.

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Book: *Thomas' Calculus*, 11$^{\text{th}}$ edition, Weir, Hass, Giordano, ISBN: 978-0321185587

Grade Components

Classwork:	10%
Homework:	10%
Quizzes:	20%
Exams:	60%

Classwork consists of participation in discussion, and activities such as team quizzes, worksheets, and other group work. Classwork activities are normally be graded on a scale of zero to ten.

Homework exercises from the textbook will be routinely, to be due at the beginning of the next class period. Homework assignments will be graded on a scale of zero to ten.

Quizzes are about twenty minutes long and occur almost every week, normally on Wednesday, covering the previous week's worth of material. These will be graded on a scale of zero to ten.

Exams are hour long assessments and are cumulative in nature. We will have about three exams per trimester. These will be graded on a scale of zero to one hundred points.

Homework is normally computational in nature; more complex problems may be assigned as take-home quizzes or exams.

Course Outline

Week	Date	Topic	Sections
Week 0	Aug 7	Vectors in $\mathbb{R}^2$	Notes
Week 1	Aug 14	Vectors in $\mathbb{R}^3$	12.1, 12.2
Week 2	Aug 21	Dot and Cross Product	12.3, 12.4
Week 3	Aug 28	Lines and Planes	12.5
Week 4	Sep 4	Quadric Surfaces	12.6
Week 5	Sep 11	Paths in $\mathbb{R}^2$ and $\mathbb{R}^3$	13.1 - 13.2
Week 6	Sep 18	Tangent, Normal, Binormal Vectors	13.3 - 13.5
Week 7	Sep 25	Functions on $\mathbb{R}^2$ and $\mathbb{R}^3$	14.1, 14.2
Week 8	Oct 2	Partial Derivatives	14.3 - 14.4
	Oct 9	Fall Break	
Week 9	Oct 16	Tangent Planes	14.6
Week 10	Oct 23	Extrema and Saddle Points	14.7
Week 11	Oct 30	Lagrange Multipliers	14.8
Week 12	Nov 6	Double Integrals	15.1, 15.2
Week 13	Nov 13	Polar Integrals	15.3
	Nov 20	Thanksgiving Break	
Week 14	Nov 27	Triple Integrals	15.4, 15.5
Week 15	Dec 4	Cylindrical and Spherical Integrals	15.6
Week 16	Dec 11	Line Integrals	16.1
Week 17	Dec 18	Vector Fields	16.2
	Dec 25	Winter Break	
	Jan 1	Winter Break	
Week 18	Jan 8	Potential and Conservation	16.3
Week 19	Jan 15	Green's Theorem	16.4
Week 20	Jan 22	Stoke's Theorem	16.5, 16.6
Week 21	Jan 29	Divergence Theorem	16.6