

Spring 2015 Course Syllabus: Math 335-002

Course Title:	Vector Analysis
Textbook:	Vector Analysis, J.E. Marsden and A. Tromba, W.H. Freeman and Company (2012) ISBN-10: 1429215089; ISBN-13: 9781429215084
Prerequisites:	(Math 211 or Math 213) with a grade of C or higher
Website:	http://web.njit.edu/~matveev/Courses/M335_S15/

Course Objectives

- Develop better understanding of key concepts concerning scalar and vector fields learned previously in Multivariable Calculus courses.
- Gain deeper knowledge of multivariate differentiation operations such as Gradient, Divergent and Curl.
- Master the Integral Theorems at the core of Vector Analysis: the Stokes (Greens') Theorem and the Divergence (Gauss') Theorem.
- Learn the utility of Vector Analysis by learning its relevance to Maxwell's equations describing the dynamics of electric and magnetic fields.

Course Outcomes

- Students are prepared for further study in the relevant technological disciplines and more advanced mathematics courses.
- Students can apply their knowledge of Vector Analysis to solve problems in engineering and the natural sciences.

Course Assessment

- The assessment of objectives is achieved through homework assignments, regular in-class quizzes, and the midterm and final examinations.

Course Outline

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Lecture	Sections	Topic
1 (1-22)	1.2-1.3	Inner Product and Cross-Product
2 (1-26)	Snow Day	
3 (1-29)	1.3-1.4	Cross-Product; Cylindrical and Spherical Coordinates
4 (2-2)	Snow Day	
5 (2-5)	2.1-2.2	Scalar Fields: Limits, Continuity
6 (2-9)	2.3, 2.6	Partial Derivatives, Gradients
7 (2-12)	2.3, 2.6	Partial Derivatives, Gradients, Linearization
8 (2-16)	2.4, 3.2	Paths and Curves, Taylor's Theorem
9 (2-19)	2.4, 3.2	Paths and Curves, Taylor's Theorem
10 (2-23)	3.1, 3.3	Iterated Partial Derivatives, Extrema of Scalar Fields
11 (2-26)	3.1, 3.3	Iterated Partial Derivatives, Extrema of Scalar Fields
12 (3-2)	2.5, 4.1	Properties of Derivatives; Acceleration and Newton's Second Law
13 (3-5)	Snow Day	
14 (3-9)	4.2-4.4	Arc Length; Vector Fields; Divergence and Curl
14 (3-11)	Exam Review	
15 (3-12)	Midterm Examination	
March 14-22 Spring Break		
16 (3-23)	5.1-5.4	Double Integrals
17 (3-26)	5.5	Triple Integrals
18 (3-30)	6.1-6.2	The Change of Variable in Multivariate Functions

19 (4-2)	6.2-6.3	Applications and Improper Integrals
20 (4-6)	7.1-7.2	Path Integrals and Line Integrals
21 (4-9)	7.3-7.6	Parametrized Surfaces, Surface Area, Surface Integral of Scalar Field
22 (4-13)	7.6-7.7	Surface Integral of Vector Fields and Applications
23 (4-16)	8.1	Green's Theorem
24 (4-20)	8.2	Stokes' Theorem
25 (4-23)	8.3	Conservative Fields
26 (4-27)	8.4	Gauss' Theorem
27 (4-30)	8.1-8.5	Application of Integral Theorems: the Maxwell's Equations in Vacuum
28 (5-4)	Extra Material	Tensors
28 (5-6)	Final Exam Review	

IMPORTANT DATES	
FIRST DAY OF SEMESTER	January 20, 2015
MIDTERM EXAM	March 12, 2015
LAST DAY TO WITHDRAW	March 30, 2015
LAST DAY OF CLASSES	May 5, 2015
FINAL EXAM PERIOD	May 8-14, 2015

Grading Policy

Assignment Weighting	
Homework	20 %
Quizzes	24 %
Midterm Exam	24 %
Final Exam	32 %

Tentative Grading Scale	
A	88 -- 100
B+	82 -- 87
B	75 – 81
C+	68 – 74
C	62 – 67
D	55 – 61
F	0 – 54

Course Policies

Email: it is important that you regularly check your NJIT email account for class assignments and announcements from your instructor. Rutgers students should email the instructor their preferred email address at the start of the semester.

Homework and Quizzes: Homework problem sets will be emailed by the instructor after each class. Homework is due on the assigned date; late homework will reduce the number of points awarded, and will only be accepted at discretion of the instructor. Quizzes are given once per week on an announced topic.

Attendance: attendance in this class is mandatory. Students accumulating more than three absences will have their grade reduced.

Important Departmental and University Policies

- [Academic Integrity Code is Strictly Enforced](#)
- [Prerequisites Requirements are Enforced](#)
- [Attendance is Required in Lower-Division Courses](#)
- [Exam Policies \(No Make Up Exams and More\)](#)

- [Cell Phone and Pager Use Prohibited in Class](#)
- [Drop Date \(MARCH 20, 2012\) is Strictly Observed](#)
- [Complete DMS Course Policies \(math.njit.edu/students/undergraduate/policies_math\)](#)