MATH 335: Vector Analysis
Spring 2025 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: Algebra and calculus of vectors. Topics include the theorems of Gauss, Green, and Stokes, curvilinear coordinates, tensors, and applications to continuum field theories. Effective From: Spring 2009.

Number of Credits: 3

Prerequisites: Math 211 with a grade of C or better or Math 213 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 335-002	Professor C. Turc

Office Hours for All Math Instructors: Spring 2025 Office Hours and Emails

Required Textbook:

Title	*Vector Calculus + Notes*
Author	Paul C. Matthews
Edition	Corrected 2000 Edition
Publisher	Springer
ISBN #	978-3540761808

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 7, 2025**. It will be strictly enforced.

COURSE GOALS

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' (Green's) 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, and to the equations of Elasticity.

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, in-class quizzes, two midterm examinations, and a final examination.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework + Quizzes	20%
Midterm Exam I	25%
Midterm Exam II	25%
Final Exam	30%

Your final letter grade will be based on the following tentative curve.

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

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

Homework and Quizzes: Homework problem sets consist of a) all problems in the textbook (they will not be graded) and b) instructor-constructed homework sets (they will be graded for 20% of the total grade). 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. FOUR (4) IN-CLASS QUIZZES will be given on an announced topic.

Exams: There will be two midterm exams held in class during the semester and one comprehensive final exam. Exams are held on the following days:

Midterm Exam I	TBA
Midterm Exam II	TBA
Final Exam Period	May 10 - May 16, 2025

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Spring 2025 Hours)

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please If you need an accommodation due to a disability please contact the Office of Accessibility Resources and Services at oars@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

https://www.njit.edu/accessibility/

Important Dates (See: Spring 2025 Academic Calendar, Registrar)

Date	Day	Event
January 21, 2025	Tuesday	First Day of Classes
January 27, 2025	Monday	Last Day to Add/Drop Classes
March 16, 2025	Sunday	Spring Recess Begins
March 22, 2025	Saturday	Spring Recess Ends
April 3, 2025	Thursday	Wellness day
April 7, 2025	Monday	Last Day to Withdraw
April 18, 2025	Friday	Good Friday - No Classes
April 20, 2025	Sunday	Easter Sunday - No Classes Scheduled
May 6, 2025	Tuesday	Thursday Classes Meet
May 7, 2025	Wednesday	Friday Classes Meet
May 7, 2025	Wednesday	Last Day of Classes
May 8, 2025	Thursday	Reading Day 1
May 9, 2025	Friday	Reading Day 2
May 10 - May 16, 2025	Friday to Thursday	Final Exam Period

Course Outline

Sections	Topics
1.1 - 1.3	*Vectors, Scalars and Dot Product*
1.4 - 1.6	*Triple Products, Scalar and Vector Fields*
2.1	*Methods of Integration and Examples*
2.2	*Line Integrals*
2.3	*Surface Integrals with Examples*

2.4	*Volume Integrals with Examples*
3.1	*Partial Differentiation and Taylor Series*
3.2	*Gradients of Scalar Fields*
3.3	*Divergence of a Vector Field, the Laplacian Operator*
3.4	*Curl of a Vector Field*
	EXAM I Thursday, February 20, 2024
5.1	*Divergence (Gauss') Theorem*
5.2	*Stokes' Theorem*
6.1, 6.3 - 6.4	*Orthogonal Curvilinear and Spherical/Cylindrical Polar Coordinates*
6.2	*Grad, Div and Curl in Orthogonal Curvilinear Coordinate Systems*
	SPRING BREAK (March 13 to March 18 2023)
4.1 - 4.3	*Suffix Notation, Kronecker Delta and Alternating Tensor*
4.4 - 4.7	*Relations Among and Properties of Vector and Tensor Operations*
	EXAM II Thursday, March 26, 2024
7.1 - 7.2	*Coordinate Transformations and Transformations of Vectors and Scalars*
7.3	*Tensors*
7.4	*Physical Examples of Tensors*
8.1 - 8.2	*Heat Transfer and Electromagnetism*
8.3 - 8.4	*The Stress Tensor. Continuum and Solid Mechanics*
8.5	*Fluid Mechanics*