MATH 335 : Vector Analysis
Spring 2021 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, and curvilinear coordinates. 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 Y. N. Young

Office Hours for All Math Instructors: Spring 2021 Office Hours and Emails

Required Textbook:

Title	*Vector Calculus + Notes*
Author	Paul C. Matthews
Edition	Corrected 2000 Edition
Publisher	Springer
ISBN #	978-3540761809

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 5, 2021**. 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 (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.

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.

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. **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	February 18, 2021
Midterm Exam II	April 1, 2021
Final Exam Period	May 7 - 13, 2021

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 2021 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.

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

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 contact Chantonette Lyles, Associate Director of the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibilty Resources and Services 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/studentsuccess/accessibility/

Important Dates (See: Spring 2021 Academic Calendar, Registrar)

Date	Day	Event
January 19, 2021	T	First Day of Classes
January 23, 2021	S	Saturday Classes Begin
January 25, 2021	M	Last Day to Add/Drop Classes
March 14 - March 21, 2021	Su - Su	Spring Recess - No Classes
April, 2, 2021	F	Good Friday - No Classes
April 5, 2021	M	Last Day to Witdraw
May 4, 2021	T	Friday Classes Meet
May 4, 2021	T	Last Day of Classes
May 5 & May 6, 2021	W & R	Reading Days
May 7 - May 13, 2021	F - R	Final Exam Period

Course Outline

Lecture	Sections	Topics	Assignment
1 (1-19)	1.1 -1.3	Vectors, Scalars and Dot Product	Selected Probs.
2 (1-21)	1.4 -1.6	Triple Products, Scalar and Vector Fields	Selected Probs.
3 (1-26)	2.1	Methods of Integration and Examples	Selected Probs.
4 (1-28)	2.2	Line Integrals	Selected Probs.
5 (2-2)	2.3 – 2.4	Surface and Volume Integrals with Examples	Selected Probs.
6 (2-4)	3.1 – 3.2	Partial Differentiation, Taylor Series and Gradients	Selected Probs.
7 (2-9)	3.3	Divergence	Selected Probs.
8 (2-11)	3.3 – 3.4	Divergence, Laplacian and Curl	Selected Probs.
9 (2-16)	4.1 – 4.3	Suffix Notation, Kronecker Delta and Alternating Tensor+Review	Selected Probs.
10 (2-18)		**EXAM I**	Selected Probs.
11 (2-23)	4.4 – 4.7	Relations Among and Properties of Vector and Tensor Operations	Selected Probs.
12 (2-25)	5.1	Gauss' Divergence Theorem and Applications	Selected Probs.
13 (3-2)	5.2	Stokes' Theorem and Applications	Selected Probs.
14 (3-4)	Notes	More on Gauss' and Stokes' Theorems	Selected Probs.
15 (3-9)	6.1	Curvilinear Coordinates	
16 (3-11)	6.1 – 6.2	Gradient, Divergence and Curl in Curvilinear Coordinates	Selected Probs.
3/14-3/21	----------	SPRING BREAK	--------------------
17 (3-23)	6.3 – 6.4	Examples in Cylindrical and Spherical Coordinates	Selected Probs.
18 (3-25)	7.1 – 7.2	Tensors	Selected Probs.
19 (3-30)	7.3	Tensors and Applications+Review	Selected Probs.
20 (4-1)		**EXAM II**	Selected Probs.
21 (4-6)	Notes	Tensors and Applications	Selected Probs.
22 (4-8)	7.4	Physical Applications of Tensors	Selected Probs.
23 (4-13)	Notes	Applications	
24 (4-15)	8.1 – 8.2	Applications – Heat Transfer and Electromagnetics	Selected Probs.
25 (4-20)	8.3 – 8.4	Continuum Mechanics and Stress Tensor	Selected Probs.
26 (4-22)	8.5	Fluid Mechanics	Selected Probs.
27 (4-27)	Notes	Fluid Mechanics	Selected Probs.
28 (4-29)		*REVIEW FOR FINAL EXAM*	
(5-4)		*LAST DAY OF CLASS (MONDAY SCHEDULE)*	