NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 328-002: Mathematical Methods for Scientists and Engineers
Spring 2020 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: The course exposes students to concepts of mathematics encountered throughout the physical science and engineering disciplines. Topics include matrix algebra, vector analysis, complex numbers, and boundary value problems in partial differential equations. 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. **Corequisite**: Math 222.

Course-Section and Instructors

Course-Section	Instructor
Math 328-002	Professor J. Ratnaswamy

Office Hours for All Math Instructors: Spring 2020 Office Hours and Emails

Required Textbook:

Title	*Mathematical Methods in the Physical Sciences*
Author	Boas
Edition	3rd
Publisher	John Wiley & Sons, Inc.
ISBN #	978-0471198260

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 6, 2020**. It will be strictly enforced.

COURSE GOALS

Course Objective: Learn some fundamental mathematical methods that are used extensively by physicists and engineers, including linear algebra, vector analysis, Fourier analysis, partial differential equations, and complex

analysis.

Course Outcome: Students will be able to use these basic mathematical methods listed above to solve the problems that are frequently encountered in their own fields such as physics and other engineering disciplines.

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 and 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	90 - 100	**C**	61 - 69
B+	85 - 89	**D**	51 - 60
B	75 - 84	**F**	0 - 50
C+	70 - 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.

Being absent from class will inhibit your ability to fully participate in class discussions and problem solving sessions and will therefore affect your grade.

Readings: You will be expected to read the textbook. For maximum benefit, you should do this before I give the lecture or immediately after. Readings are from Boas.

Homework: Problem sets will be assigned and collected approximately biweekly. Note that this is 20% of your grade!

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

Midterm Exam I	February 17, 2020
Midterm Exam II	March 23, 2020
Final Exam Period	May 8 - 14, 2020

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 2020 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: Disability Support Services (DSS) 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 Disability Support 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 Disability Support 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 Disability Support Services (DSS) website at:

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

Important Dates (See: Spring 2020 Academic Calendar, Registrar)

Date	Day	Event
January 21, 2020	T	First Day of Classes
January 31, 2020	F	Last Day to Add/Drop Classes
March 15 - 22, 2020	Su-Su	Spring Recess: No Classes/ University Open
April 6, 2020	M	Last Day to Withdraw
April 10, 2020	F	Good Friday - University Closed
May 5, 2020	T	Friday Classes Meet - Last Day of Classes
May 6 & 7, 2020	W & R	Reading Days
May 8 - 14, 2020	F - R	Final Exam Period

Course Outline

Week	Subject	Reading
1	Matrix Algebra I: Systems of linear equations, determinants, solution by row reduction	3.1-3.3
2	Matrix Algebra II: Eigenvalues and Eigenvectors,Diagonalization	parts of 3.6-3.12
3	Vector Analysis I: Dot, Cross, and Triple Products, differentiation of vectors	6.1-6.6

4	Vector Analysis II: Line integrals, Green's Theorem	6.7-6.8
5	Vector Analysis III: Divergence & Curl, Divergence theorem and Stokes' Theorem	6.9-6.11
	MIDTERM EXAM I: MONDAY ~ FEBRUARY 17, 2020	
6	Fourier Analysis I: The basics of Fourier Series	7.1-7.5
7	Fourier Analysis II: More Fourier Series	7.6-7.11
8	Fourier Analysis III: Fourier Transforms	7.12
9	SPRING RECESS / MARCH 15 - 22, 2020 / NO CLASSES SCHEDULED	
10	Partial Differential Equations I: Partial Differentiation	Chapter 4
11	PDE II: Laplace, Diffusion and Wave Equations	13.1-13.5
	MIDTERM EXAM II: MONDAY ~ MARCH 23, 2020	
12	PDE III: Eigenfunction Expansions and Integral Transforms	13.6-13.9
13	Complex Analysis I: Complex Numbers	Chapter 2
14	Complex Analysis II: Analytic Functions and Contour Integrals	14.1-14.4
15	Complex Analysis III: Residues	14.5-14.7
16	Complex Analysis IV: More Residues	14.8
	FINAL EXAM WEEK: MAY 8 - 14, 2020	