NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 630-102: Linear Algebra and Applications
Spring 2020 Graduate 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: (This course is not intended for students in the Master's in Applied Mathematics program or in the doctoral program in Mathematical Sciences.) Development of the concepts needed to study applications of linear algebra and matrix theory to science and engineering. Topics include linear systems of equations, matrix algebra, orthogonality, eigenvalues and eigenvectors, diagonalization, and matrix decomposition.

Number of Credits: 3

Prerequisites: MATH 211 or MATH 213, and MATH 222.

Course-Section and Instructors

Course-Section	Instructor
Math 630-102	Professor E. Ammicht

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

Required Textbooks:

Title	*Linear Algebra and Its Applications*
Author	Strang
Edition	4th
Publisher	Brooks Cole
ISBN #	0-030105676

ExtraInfo

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

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%
Projects	20%
Midterm Exam	25%
Final Exam	35%

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

A	86 - 100	**C+**	64 - 69
B+	80 - 85	**C**	50 - 63
B	70 - 79	**F**	0 - 49

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 Projects Policy: Short homework will be assigned each week. Homework, projects and other take-home assignments should represent your individual effort; no collective group work is allowed. Under the Honor Code, students are obligated to report any instances of plagiarism (for instance, copying of homework), to the Instructor.

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

Midterm Exam	March 9, 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: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- http://math.njit.edu/students/policies_exam.php

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

ADDITIONAL RESOURCES

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

Dates	Lecture + Sections		Chapter + Pages	Topic & Assignment
1/27/2020	1 & 2	**SECTIONS**	**CHAPTER 1**	**MATRICES AND GAUSSIAN ELIMINATION**
2/3/2020		1.1:	Page: 1-3	
		1.2:	Page: 3-11	Problems: 1, 3, 5, 8, 9
		1.3:	Page: 11-19	Problems: 13, 25, 30
		1.4:	Page: 19-32	Problems: 1, 3, 5, 7, 12-15, 18, 21
		1.5:	Page: 32-45	Problems: 4-6, 15, 18, 19
		1.6:	Page: 45-58	Problems: 1, 3, 6, 8, 13, 15, 19
		1.7:	Page: 58-64	Problems: 3-5, 10
		R1:	Page: 65-67	Problems: 1, 4, 10, 13, 17, 19, 28
2/10/2020	3 & 4	**SECTIONS**	**CHAPTER 2**	**VECTOR SPACES**
2/17/2020		2.1:	Page: 69-77	Problems: 1-3, 5-9
		2.2:	Page: 77-91	Problems: 1-7
		2.3:	Page: 92-102	Problems: 1-3, 11, 27, 30, 33, 37
		2.4:	Page: 102-114	Problems: 2-4, 10, 13, 15, 18
		2.5:	Page: 114-124	Problems: 1-5
		2.6:	Page: 125-137	Problems: 1-3, 7-9
		R2:	Page: 137-140	Problems: 1, 4-7, 9, 11, 14, 21, 28, 29, 32, 33
2/24/2020	5 & 6	**SECTIONS**	**CHAPTER 3**	**ORTHOGONALITY**
3/2/2020		3.1:	Page: 141-152	Problems: 1-6, 8-10, 12, 14
		3.2:	Page: 152-160	Problems: 3-5, 7, 8, 11
		3.3:	Page: 160-174	Problems: 1, 3, 7, 12, 13, 17

		3.4:	Page: 174-188	Problems: 1-6, 8, 13, 16, 17
		R3:	Page: 198-200	Problems: 1, 3, 4, 14, 20, 28, 33
3/9/2020	7	└►	**MIDTERM EXAMINATION**	
3/9/2020	7 & 8	**SECTIONS**	**CHAPTER 4**	**DETERMINANTS**
3/23/2020		4.1:	Page: 201-203	
		4.2:	Page: 203-210	Problems: 1, 4, 7, 10, 12, 13, 16-18
		4.3:	Page: 210-220	Problems: 1, 2, 17, 20
		4.4:	Page: 220-229	Problems: 2, 3, 5, 6, 9, 10
		R4:	Page: 230-231	Problems: 1, 2, 6, 11, 15
3/30/2020	9 & 10	**SECTIONS**	**CHAPTER 5**	**EIGENVALUES AND EIGENVECTORS**
4/6/2020		5.1:	Page: 233-244	Problems: 1, 2, 5, 7, 8, 10, 14
		5.2:	Page: 245-254	Problems: 1-3, 5-8, 10, 13
		5.3:	Page: 254-266	Problems: 3, 8, 9, 12
		5.4:	Page: 266-280	Problems: 1-3, 8-10, 15, 20
		5.5:	Page: 280-292	Problems: 1-2, 6-8, 11, 20-22
		5.6:	Page: 293-306	Problems: 1, 2, 5, 8, 13, 16, 25
		R5:	Page: 307-309	Problems: 1, 3, 8, 20
4/13/2020	11 & 12	**SECTIONS**	**CHAPTER 6**	**POSITIVE DEFINITE MATRICES**
4/20/2020		6.1:	Page: 311-317	Problems: 1, 2, 4, 5, 7, 9
		6.2:	Page: 318-330	Problems: 2, 4-6, 8, 10-14
		6.3:	Page: 331-338	Problems: 1, 3, 15, 17
4/27/2020	13	**SECTIONS**	**CHAPTER 7**	**COMPUTATIONS WITH MATRICES**
		7.1:	Page: 351-357	
		7.2:	Page: 357-359	Problems: 1, 4, 11
		7.3:	Page: 359-367	Problems: 1, 7, 9, 11
		7.4:	Page: 367-375	Problems: 1, 2, 7
5/4/2020	14	**REVIEW FOR FINAL EXAM**		
5/11/2020		**FINAL EXAMINATION**		