

## MAS 4107: LINEAR ALGEBRA 2

**Department of Mathematical Sciences**

**Spring 2023**

**Credit Hours: 3**

**Lecture Times:** MWF 9 – 9:50 AM

**Instructor:** Dr. Zvi Rosen

**Office Location:** SE 224

**Office Hours:** TBA or by appointment

**Email:** [rosenz@fau.edu](mailto:rosenz@fau.edu)

**Zoom Office Hours Link:** <https://fau-edu.zoom.us/my/rosenz>

## COURSE DESCRIPTION

Linear Algebra is an essential course for two reasons:

*First*, the tools of linear algebra are used all over mathematics, throughout the sciences, and are rampant in applications. Particularly in data science, whether in video compression, deep learning, or network analysis, linear algebra is *the* most important tool.

*Second*, the objects of study in linear algebra are relatively simple to describe in words and to visualize geometrically; so, they are the perfect place to hone our proof-writing skills! Careful and precise communication is vital in every area of study and every profession. Reading proofs critically and writing them carefully will train you in this form of communication.

In both the subject matter and the mode of discourse, this is an exciting course to be involved in, and I look forward to studying with you!

*From the FAU Catalog:* Vector spaces, complex numbers, basis and dimension, eigenvalues and eigenvectors, Cayley-Hamilton theorem, Jordan normal form, and other topics.

## COURSE PREREQUISITES

Matrix Theory (MAS 2103) and Discrete Mathematics (MAD 2104), or permission of instructor.

## COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

1. Communicate mathematical arguments clearly and persuasively.
2. Critically read and digest mathematical writing.
3. Explain definitions and prove basic theorems from linear algebra.
4. Build a database of examples and counter-examples for intuition.

## INSTRUCTIONAL METHOD

This class is designated as in-person, meeting on MWF 9:00-9:50 am in PS 111. There is no remote option for this course. Course materials are accessible only through FAU's learning management system, Canvas. You must log into Canvas with your FAU ID and Password to access the materials and assignments in this course. If you do not know your FAU ID or Password, contact OIT for help.

## TIME COMMITMENT PER CREDIT HOUR

This course has three (3) credit hours. For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

## REQUIRED TEXT

In this course, you will need the textbook *Linear Algebra Done Right*, third edition, Sheldon Axler. We will cover Chapters 1, 2, 3, 4, 5, 8, and 10 in this textbook.

## COURSE ASSESSMENTS, ASSIGNMENTS & GRADING POLICY

### GRADING CRITERIA

#### **Preview Activities (total 10%, assigned 1-2 times weekly)**

You will be asked to complete readings and watch videos, then complete a quiz reviewing that material. These quizzes are to be completed on your own, not in collaboration with peers. Don't worry about losing points for having the wrong answer: these will be graded for completion and effort.

### **Problem Sets (total 25%, assigned every two weeks)**

Every two weeks you will be asked to submit written problems that you have worked on in class. You will work through these problems in collaboration with your peers, but writing will be done on your own. For each assignment, 1/3 of credit will be given for your participation in class, and 2/3 for the quality of submitted work.

### **Presentation (total 15%, one process over the course of the semester)**

At the end of the semester a number of classes will be devoted to student presentations. The presentations will last about 15 minutes and will introduce some topic related thematically to linear algebra. The first part of this assignment is a half-page writeup due February 24, describing the topic and the sources you will use to research it. The second part due April 3 is a full writeup of notes of what you would like to present. The final part is the actual delivery of the presentation which will be assigned semi-randomly on the last three sessions of class.

### **Mastery Exams (total 50%, six midterm exams and one final)**

There will be seven mastery exams over the course of the semester. Each question will be aimed at demonstrating mastery of a skill on the list of “Mastery Question Types.” For each question, you will receive a grade of **M**, mastered, **P**, progressing, or **X** not assessable. More details about the grading system will be given in a separate document. Your exam grade will be the percentage of Mastery Question Types that you have mastered by the end of the semester.

<b>Assessment</b>	<b>Percentage (%)</b>
Preview Activity	10%
Problem Sets (including Participation)	25%
Presentation	15%
Mastery Exams	50%
<b>TOTAL:</b>	<b>100%</b>

### **GRADE SCALE**

<b>Grade</b>	A	A-	B+	B	B-	C+
<b>Percentage (%)</b>	93 – 100%	90 – 92%	87 – 89%	83 – 86%	80 – 82%	77 – 79%
<b>Grade</b>	C	C-	D+	D	D-	F
<b>Percentage (%)</b>	73 – 76%	70 – 72%	67 – 69%	63 – 66%	60 – 62%	0 – 59%

### **LATE ASSIGNMENTS POLICY**

For expeditious grading, it is vital that your assignments are submitted on time. If you expect to be late on an assignment for an excusable reason, please notify the instructor well in advance, and he may afford an opportunity for partial credit.

### MAKE-UP POLICY FOR TESTS

Tests in this course are opportunities to demonstrate your mastery of the topics so far discussed. If one exam doesn't go great, you will have opportunities to re-assess those topics at every future exam. For this reason, additional make-up is unnecessary.

### INCOMPLETE GRADE POLICY

The University policy states that a student who is passing a course but has not completed all work due to exceptional circumstances, may, with consent of the instructor, temporarily receive a grade of incomplete ("I"). The assignment of the "I" grade is at the discretion of the instructor but is allowed only if the student is passing the course.

### TENTATIVE COURSE PACING SCHEDULE

The section numbers below refer to *Linear Algebra Done Right*, Third Edition, by Sheldon Axler (the course textbook).

Week of	Monday	Wednesday	Friday
January 8	Intro	Proof Review	1.A
January 15	MLK Day	1.B	1.C
January 22	2.A a	2.A b	2.B <b>HW #1 (Chapter 1)</b>
January 29	2.C	3.A a	<b>ME #1</b>
February 5	3.A b	3.B	3.C a <b>HW #2 (Chapter 2)</b>
February 12	3.C b	3.D a	<b>ME #2</b>
February 19	3.D b	3.E	3.F a <b>HW #3 (Ch 3.A-D)</b>
February 26	3.F b	4 a	<b>ME #3</b>
March 5	Spring Break		

March 12	4 b	5.A	5.B a <b><i>HW #4 (Ch 3.E-F)</i></b>
March 19	5.B b	5.C	<b><i>ME #4</i></b>
March 26	8.A a	8.A b	8.B <b><i>HW #5 (Ch 4-5)</i></b>
April 2	8.C	8.D	(Passover) <b><i>ME #5</i></b>
April 9	10.A	10.B	Presentations <b><i>HW #6 (Ch 8, 10)</i></b>
April 16	Presentations	Presentations	<b><i>ME #6</i></b>
April 23	Review	Reading Days	<b><i>Final 7:45 – 10:15 AM</i></b>

## COURSE POLICIES

### CODE OF ACADEMIC INTEGRITY POLICY STATEMENT

Students at Florida Atlantic University should endeavor to maintain the highest ethical standards. Academic dishonesty is a serious breach of these ethical standards because it interferes with the University mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive to the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

On a personal note, I have on various occasions been forced to report students for cheating on exams using internet resources. The first time you get reported for cheating, you get a zero for the assignment and a record goes on your transcript (which you would need for job applications or graduate school.) This mark can be removed if you undergo peer counseling. The second time you are reported, the mark can no longer be expunged. I hate to see students in this position, so please **DO NOT CHEAT**.

### PLAGIARISM

[Plagiarism](#) is unacceptable in the University community. Academic work must be an original work of your own thought, research, or self-expression. When students borrow ideas, wording, or organization from another source, they must acknowledge that fact in an appropriate manner. Plagiarism is the deliberate use and appropriation of another's work without

identifying the source and trying to pass off such work as one's own. Any student who fails to give full credit for ideas or materials taken from another has plagiarized. This includes all discussion board posts, journal entries, wikis, and other written and oral presentation assignments. If in doubt, cite your source.

## ATTENDANCE POLICY

You are expected to attend every class since group work in class is the main way we acquire mastery of the material. Furthermore, you should access the course website at least **three times a week** to ensure you do not miss pertinent postings, messages, or announcements. If you are experiencing major illness, absences due to University duties, or other large-scale issues, contact the instructor immediately to formulate a resolution.

## NETIQUETTE

Due to the casual communication common in the online environment, students are sometimes tempted to relax their grammar, spelling, and/or professionalism. Please remember that you are adult students and professionals—your communication should be appropriate. For more in-depth information, please see the [FAU statement on netiquette](#).

## CLASSROOM ETIQUETTE/DISRUPTIVE BEHAVIOR POLICY STATEMENT

Disruptive behavior is defined in the FAU Student Code of Conduct as "... activities which interfere with the educational mission within classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct.

For more information, please see the [FAU Office of Student Conduct](#).

## COMMUNICATION POLICY

### EXPECTATIONS FOR STUDENTS

#### Announcements

You are responsible for reading all announcements posted by the instructor. Check the course announcements each time you log in.

### **Email/Video Conferencing**

You are responsible for reading all your course email and responding in a timely manner.

### **Course-Related Questions**

Post course-related questions to the FAQ discussion board. This allows other participants with the same question to benefit from the responses. Also, make sure you review this forum prior to posting a question. Someone may have already asked and answered the question in previous posts.

## **INSTRUCTOR'S PLAN FOR CLASSROOM RESPONSE TIME & FEEDBACK**

### **Email/Video Conferencing Policy**

Except for weekends and holidays, the instructor will typically respond to email (Canvas inbox or FAU email) within 48 hours. You should ask course-related questions in the FAQ discussion board. If you have questions of a personal nature, you should email the instructor.

### **Assignment Feedback Policy**

The instructor will provide feedback on submitted assignments within one week of the submission date. Some assignments may require a longer review period, which the instructor will communicate to you.

### **Course-Related Questions Policy**

Except weekends and holidays, the instructor will generally answer questions within 48 hours.

### **Electronic Communication Policy**

In addition to the University's policy, please consider the following:

- Privacy, confidentiality, and security in all electronic communications.
- All electronic communication resources must be used for the course and in alignment with the University mission.
- Prohibited use of false identity, false identity pseudonyms, or anonymous (sender's name or electronic identification is hidden).
- Access without consent.
- Disruption of services including introducing computer contaminants (viruses).
- Harassment of any kind.

Please see the Office of Information Technology's policies on [Cyber Security Awareness](#).

## SUPPORT SERVICES & ONLINE RESOURCES

- [Center for eLearning and Student Success](#)
- [Counseling and Psychological Service \(CAPS\)](#)
- [FAU Libraries](#)
- [Freshmen Academic Advising Services](#)
- [Math Learning Center](#)
- [Office of Information Technology Helpdesk](#)
- [Office of International Programs and Study Abroad](#)
- [Office of Undergraduate Research and Inquiry](#)
- [Student Accessibility Services](#)
- [University Center for Excellence in Writing](#)

## CAPS STATEMENT

Life as a university student can be challenging mentally, emotionally, and physically. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services to help improve and maintain well-being. For CAPS services, students need to be currently enrolled, have paid the health fee, be physically located in Florida when services are provided, have phone or videoconferencing capabilities, and have access to a safe/private location for sessions. For those outside of Florida, CAPS will assist students in getting connected to services/providers in your area for ongoing support. For more information, go to <http://www.fau.edu/counseling/> or call 561-297-3540.

## FACULTY RIGHTS & RESPONSIBILITIES

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise.

**To ensure these rights, faculty members have the prerogative to:**

- Establish and implement academic standards.
- Establish and enforce reasonable behavior standards in each class.
- Recommend disciplinary action for students whose behavior may be judged as disruptive under the *Student Code of Conduct*.

## SELECTED UNIVERSITY & COLLEGE POLICIES

### ACCESSIBILITY POLICY STATEMENT

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations to properly execute coursework due to a disability, must register with Student Accessibility Services (SAS) located in the Boca Raton, Davie, and Jupiter campuses and follow all SAS procedures. For additional information, please consult [Student Accessibility Services](#).

#### Contact

- **Boca Raton:** (561) 297-3880  
Fax: (561) 297-2184, TTY: 711
- **Davie:** (954) 236-1222  
Fax: (954) 236-1123, TTY: 711
- **Jupiter:** (561) 799-8721  
Fax: (561) 799-8721, TTY: 711

### GRADE APPEAL PROCESS

You may request a review of the final course grade when you believe that one of the following conditions apply:

- There was a computational or recording error in the grading.
- The grading process used non-academic criteria.
- There was a gross violation of the instructor's own grading system.

[Chapter 4 of the University Regulations](#) contains information on the grade appeals process.

### RELIGIOUS ACCOMMODATION POLICY STATEMENT

In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. For further information, please see [Academic Policies and Regulations](#).

### UNIVERSITY APPROVED ABSENCE POLICY STATEMENT

In accordance with rules of the Florida Atlantic University, students have the right to reasonable accommodations to participate in University approved activities, including athletic or scholastics teams, musical and theatrical performances and debate activities. It is your responsibility to notify the instructor at least one week prior to missing any course assignment.

#### **DROPS/WITHDRAWALS**

You are responsible for completing the process of dropping or withdrawing from a course. Please click on the following link for more information on dropping and/or withdrawing from a course. Please consult the [FAU Registrar Office](#) for more information.

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**The instructor reserves the right to adjust this syllabus as necessary.**