Course Syllabus

Title:	Linear Algebra	**Instructor:**	James Herring
Department:	Mathematics	**Email:**	herring.math.uh@gmail.com
Number:	Math 2331-05	**Webpage:**	www.math.uh.edu/∼herring
Semester:	Fall 2018	**Office Hours:**	TTh 4:00-5:00PM
Lecture Times:	MWF 4:00-5:00PM		or by appointment
Format:	Online	**Office:**	PGH-610

Notice: The content in this syllabus is subject to change during the semester. Changes will be announced by the instructor via a post to Blackboard, and students are responsible for being aware of any changes after such an announcement.

Major Assignments and Grade Distribution

Final grades will be a weighted average of the weekly homework, two midterms, and one final exam. They will be weighted and scheduled as follows unless announced otherwise:

Assessment	Weight	Date	Time	Location
Homework	30%	weekly	-	-
Midterm 1	20%	Sept. 28	4:00-5:00PM	TBD
Midterm 2	20%	Nov. 2	4:00-5:00PM	TBD
Final Exam	30%	Dec. 7	5:00-8:00PM	TBD

Letter grades will be calculated as a weighted average of the homework, midterms, and final exams using the following scale:

A	B	C	D	F
100–90%	89–80%	79–70%	69–60%	<60%

Required Textbook

Linear Algebra and Its Applications (4th Edition), David C. Lay

Course Format

Online interface: All lectures, homework, and course materials will be administered online using Blackboard. Students can find the course syllabus, course announcements, lecture notes, lecture videos, homework assignments, homework solutions, and all other course material there. The Blackboard course listing is 2018FA-18236-MATH2331-Linear Algebra, and all students enrolled are responsible for ensuring they have access. If not, please email the instructor as soon as possible.

Lectures: All lectures will be delivered online using Blackboard Collaborate. Scheduled lecture times are Monday, Wednesday, and Friday from 4:00-5:00PM. Lectures will consist a video screen share with live notes and commentary on the course material. Afterward, video (.mp4) and notes (.pdf) for each lecture will be made available on Blackboard for review.

Homework: There will be approximately 10-12 graded homework projects assigned and collected weekly during the semester. Each homework assignment will have two parts: written problems taken from the textbook and coded Matlab exercises. All exercises are intended as a form of self-assessment to help the student gain mastery of the ideas and materials presented in class.

Homework for the upcoming week's lecture material will be assigned on Blackboard every Monday. All homework should be completed and submitted electronically via email to herring.math.uh@gmail.com by the following Monday at 12:00PM (noon) unless otherwise notified. All submitted homework should be neat and legible or may not receive credit. Written exercises will graded for completion, not correctness. The coded portion of the homework will be graded by checking if the code is correct and runs to completion. Detailed solution for both written and coded exercises will be posted Blackboard on Mondays at 12:00PM following the due deadline.

Exams: The two midterms and the final will be administered on campus, and students must take them at the scheduled place and time. The scheduled dates and times are listed above and are non-negotiable. All students enrolled are responsible for their attendance for written exams. The locations for the exams will be announced as early as possible in the semester after room reservations made.

Correspondence: All questions and concerns about the class should be emailed to herring.math.uh@gmail.com or discussed in person at office hourse. Emails will be responded to in a timely manner in the order they are received. Patience is appreciated due to the large number of students enrolled.

Course Objectives and Content

Upon completion of this course, students should be able to apply the principles of linear algebra to analyze and solve relevant problems. Below is a list of specific topics to cover:

1 Linear Equations in Linear Algebra

- 1.1 Systems of Linear Equations
- 1.2 Row Reduction and Solution Sets of Linear Systems
- 1.3 Vector Equations
- 1.4 The Matrix Equation $\boldsymbol{Ax} = \boldsymbol{b}$
- 1.5 Solutions Sets of Linear Systems
- 1.7 Linear Independence
- 1.8 Introduction to Linear Transformations
- 1.9 The Matrix of a Linear Transformation

2 Matrix Algebra

- 2.1 Matrix Operations
- 2.2-3 The Inverse of a Matrix and Characterizations of Invertibility
- 2.4 Partitioned Matrices
- 2.8 Subspaces of $\mathbb{R}^n$
- 2.9 Dimension and Rank

3 Determinants

- 3.2 Properties of Determinants, the Determinant and Invertibility
- 3.3 Cramer's Rule, Volume, and Linear Transformations
- * Permutation Matrices (not in text)

4 Vector Spaces

- 4.1 Vector Spaces and Subspaces
- 4.2 Null Spaces, Column Spaces, and Linear Transformations
- 4.3 Linearly Independent Sets; Bases
- *4.4 Coordinate Systems

- 4.5 The Dimension of Vector Space
- 4.6 Rank
- *4.7 Change of Basis
- *4.9 Applications to Markov Chains

5 Eigenvalues and Eigenvectors

- 5.1 Eigenvectors and Eigenvalues
- 5.2 The Characteristic Equation
- 5.3 Diagonalization
- *5.4 Eigenvectors and Linear Transformations
- *5.5 Complex Eigenvalues
- *5.6-8 Applications

6 Orthogonality and Symmetric Matrices

- 6.1 Inner Product, Length, and Orthogonality
- 6.3 Orthogonality and Projections
- 6.4 The Gram-Schmidt Process
- 6.5 Least-Squares Problems

7 Symmetric Matrices and Quadratic Forms

- *7.1 Diagonalization of Symmetric Matrices
- *7.2 Quadratic Forms
- *7.3 The Singular Value Decomposition

* Sections are optional, as time permits

Academic Honesty

All students are expected to abide by the standards and rules in UH's Academic Honesty Policy, available online at: https://www.uh.edu/provost/policies-resources/honesty/

CSD Accommodations

Academic Adjustments/Auxiliary Aids: The University of Houston System complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for students who have a disability. In accordance with Section 504 and ADA guidelines, University of Houston strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please visit The Center for Students with DisABILITIES (CSD) website at http://www.uh.edu/csd/ for more information.

Accommodation Forms: Students seeking academic adjustments/auxiliary aids must, in a timely manner (usually at the beginning of the semester), provide their instructor with a current Student Accommodation Form (SAF) (paper copy or online version, as appropriate) from the CSD office before an approved accommodation can be implemented.

Details of this policy, and the corresponding responsibilities of the student are outlined in The Student Academic Adjustments/Auxiliary Aids Policy (01.D.09) document under [STEP 4: Student Submission (5.4.1 & 5.4.2), Page 6]. For more information please visit the Center for Students with Disabilities Student Resources page.

Additionally, if a student is requesting a (CSD approved) testing accommodation, then the student will also complete a Request for Individualized Testing Accommodations (RITA) paper form to arrange for tests to be administered at the CSD office. CSD suggests that the student meet with their instructor during office hours and/or make an appointment to complete the RITA form to ensure confidentiality.

*Note: RITA forms must be completed at least 48 hours in advance of the original test date. Please consult your counselor ahead of time to ensure that your tests are scheduled in a timely manner. Please keep in mind that if you run over the agreed upon time limit for your exam, you will be penalized in proportion to the amount of extra time taken.

UH CAPS

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach (CAPS) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus.