Math 2568 Section 30 - Linear Algebra (Spring 2020)

Instructor: Prof. Maria Angelica Cueto (Office: Math Tower (MW) 636; Email: cueto.5@osu.edu)

Office Hours: Mon: 4:00pm-5:20pm ; Fr: 12:40pm-1:40pm in MW 636 (or by appointment if needed)

Course Description: This course is designed to introduce ideas from linear algebra, with emphasis in both its theoretical and practical aspects. Topics include matrix algebra, vector spaces and linear maps, bases and dimension, eigenvalues and eigenvectors, applications.

Prerequisites: Prereq: A grade of C- or above in 1172, 1544, 2153, 2162.xx, 2182H, or 4182H; or a grade of C- or above in both 1152 and CSE 2321; or credit for 154, 254.xx, 263.xx, 263.01H, or 264H. Not open to students with credit for 4568 (568), 5520H (520H), or 572.

Websites: https://people.math.osu.edu/cueto.5/teaching/2568/Sp20 ; https://carmen.osu.edu

Text: L.W. Johnson, R.D. Riess, J.T. Arnold: *Introduction to Linear Algebra*, 5th edition, Pearson.

Lectures: Mon-Wed-Fri 9:10AM-10:05AM in McPherson Chemical Lab (MC) 1005.

Grading: Your final raw score for this course will be computed using the following weights:

Final Exam (Friday April 24, 10:00am-11:45am)	35%	Homework 1-13	15%
Midterm 1 (Friday January 31, in class)	20%	Quizzes 1-5	10%
Midterm 2 (Friday March 6, in class)	20%		

Your course letter grade will then be determined based on: (1) your **course percentile** (your relative rank among your peers), and (2) my determination of the overall class performance level.

For example, if your final raw score is 70/100 and exactly half of the class has a lower raw score, then your course percentile will be 50%. It is impossible to give the final percentile-to-letter-grade correspondence *a priori*. A reasonable percentile-to-letter-grade **estimate** is the following:

Letter grade	A	A-	B+	B	B-	C+	C	C-	D	E
Percentile range	100-90	90-85	85-80	80-70	70-65	65-60	60-40	40-35	35-20	20-0

If your degree program requires a certain letter grade in this course, it is a good idea to think about the likelihood of you ending up in each of the above ranges above early in this semester.

Quizzes: There will be 5 surprise quizzes during the semester, worth 5 points each, consisting of problems (almost) verbatim from those on the homeworks. ***Your lowest quiz grade will be dropped***.

Homework: There will a total of 13 homeworks. The grader will select three problems for grading, each worth 4 points: two points for a correct solution, two points for a good presentation and sufficient explanations. Two extra points will be assign for completing each assignement.

You are strongly encourage to work out the homework problems in teams, but *individual solutions* must be turned in for grading. **No late homework will be accepted**. **Your two lowest homework grades will be dropped**.

Showing Your Work: Mathematics is not just about deriving the correct numerical solution to a problem. It is also about convincing others that your method of calculation is appropriate. **Insufficiently supported answers may receive partial or no credit on quizzes and exams.**

Calculators etc.: Calculators, cell phones and other electronic devices **will not be permitted**.

Missed Coursework: No late exams or quizzes will be accepted without prior written permission. All requests for rescheduling (e.g. due to sickness, athlete duties or unforseen circumstances) must be made in writing at least 48 hours before the regularly scheduled time. Within 48 hours of an exam or quiz only documented legitimate family or medical emergencies will be considered as excuses.

Course Topics: We will cover Chapters 1-6 of the textbook (see above). This will include:

Ch. 1 Matrices and Systems of Linear Equations

- 1.1 Introduction to Matrices And Systems of Linear Equations
- 1.2 Echelon Form and Gauss-Jordan Elimination
- 1.3 Consistent Systems of Linear Equations
- 1.5 Matrix Operations
- 1.6 Algebraic Properties of Matrix Operations
- 1.7 Linear Independence and Nonsingular Matrices
- 1.9 Matrix Inverses and Their Properties

Ch. 2 Vectors in 2-Space and 3-Space

- 2.1 Vectors in the Plane
- 2.2 Vectors in Space
- 2.3 The Dot Product and the Cross Product
- 2.4 Lines And Planes in Space

Ch. 3 The Vector Space $\mathbb{R}^n$

- 3.1 Introduction to the Vector Space $\mathbb{R}^n$
- 3.2 Vector Space Properties of $\mathbb{R}^n$
- 3.3 Examples of Subspaces
- 3.4 Bases for Subspaces
- 3.5 Dimension
- 3.6 Orthogonal Bases for Subspaces
- 3.7 Linear Transformation from $\mathbb{R}^n$ to $\mathbb{R}^m$

Ch. 4 The Eigenvalue Problem

- 4.1 The Eigenvalue Problem for 2×2 Matrices
- 4.2 Determinants and the Eigenvalue Problem
- 4.4 Eigenvalues and the Characteristic Polynomial
- 4.5 Eigenvectors and Eigenspaces
- 4.6 Complex Eigenvalues and Eigenvectors
- 4.7 Similarity Transformations and Diagonalization

Ch. 5 Vector Spaces and Linear Transformations

- 5.1 Introduction to Vector Spaces and Linear Transformations
- 5.2 Vector Spaces
- 5.3 Subspaces
- 5.4 Linear Independence, Bases and Coordinates
- 5.7 Linear Transformations
- 5.8 Operations With Linear Transformations
- 5.9 Matrix Representations Of Linear Transformations

Ch. 6 Determinants

- 6.1 Introduction to Determinants
- 6.2 Cofactor Expansions Of Determinants
- 6.3 Elementary Operations And Determinants
- 6.4 Cramer's Rule

Academic Misconduct Statement: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7). For additional information, see the Code of Student Conduct at http://studentlife.osu.edu/csc/.

Disability Statement: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information:slds@osu.edu; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue. http://www.ods.osu.edu/