Math0280: Introduction to Matrices and Linear Algebra

Course Syllabus: Fall 2023

Lecture hours: Wednesday 8:15-11:55, 13:50-16:25,

Thursday: 19:20-21:55

Instructor: Dr. Shiquan Zhang

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Cell phone number: 18782054234

Office Hours: Wednesdays 12:00 -13:30

Text: David Poole: Linear Algebra, A Modern Introduction, 4th ed

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Course Description:

The principal topics of the course include vectors, matrices, determinants, linear transformations, eigenvalues and eigenvectors, and selected applications. We will cover most of Chapters 1, 2, 3, 4, 5, and 7. The essential concepts/ideas in Chapter 6 will also be discussed repeatedly, even though the Chapter will not be officially lectured.

Objectives include:

· To provide an understanding of why matrices are critical to modern science.

· To acquaint the students with the fundamental concepts of linear algebra.

· To provide an understanding of the processes by which real-life problems are solved by using linear algebra.

· To develop an understanding of the role of matrices in engineering.

· To familiarize students with computer-based linear algebra analysis through available software packages.

Applicable ABET Outcomes:

The course is designed to provide a foundation in both computational and theoretical linear algebra. At the conclusion of the course, the student will be able to, for example:

• Perform matrix and vector operations.

• Find an inverse of a matrix.

• Find the eigenvalues and eigenvectors of matrices with real coefficients.

• Find a basis for row space, column space and null space for a given matrix.

• Determine if a set of vectors is linearly independent or not.

• Find the orthogonal complement of a subspace in a finite dimensional vector space.

Lectures: This course will be taught in the regular mode. The regular classroom approach will be discussed during the first lecture in detail.

Homework: Homework problems will be assigned each week and are

due in recitation the following week. Late homework is not accepted and homework not turned in will receive a score of 0. All work (computer and manual) should be shown for each problem so that partial credit may be given.

Class Conduct: Please turn off your phones prior to the beginning of class. If you feel the need to text or check your email during class, kindly leave the room.

Re-Grades: If you feel there has been an error in grading an assignment, you have **one week** from the day it was returned in class to submit it for a re-grade. When you resubmit the assignment, it must be accompanied by a written explanation of the potential grading mistake.

In Class Work /Class Exercises: There will be in class exercises assigned; if you are not in class you will be given a score of 0. These exercises will count as extra quiz credit. It will be possible to have quiz average over 100%.

Quizzes: Several random quizzes will be assigned in class. If you miss a quiz, you will be given a score of 0.

Exams: There will be a final exam after the whole course. Everybody should take this exam except under extenuating circumstances.

Cheating of any form on quizzess or exams will result in a grade of 0 for that quiz or exam.

Grading: Continuous assessment 40% + Final exam 60%

Final letter grades will be assigned as follows:

A 90-100 A- 85-89 B+ 80-84 B 76-79 B- 73-75

C+ 70-72 C 66-69 C- 63-65 D+ 61-62 D 60

F Below 60%

TENTATIVE SCHEDULE

Lecture Topics

Week 1 Introduction to linear systems

Week 2 Guassian elimination

Week 3 Matrix algebra

Week 4 Inverse of matrix

Week 5 Transpose and special matrices

Week 6-7 Determinants

Week 8 Adjoint matrix

Week 9 Linear independency

Week 10 Linear subspace

Week 11 Rank of matrices

Week 12 Solution set of linear systems

Week 13 Eigen value and eigen vectors

Week 14 Similarity and Diagonalization

Week 15 Orthogonality

Week 16 Orthogonal Diagonalization of Symmetric Matrices

Week 17 **Final Exam**