

**SCUPI – Math0280 Introduction to Matrices and Linear Algebra
Spring Semester 2026, Section 1**

INSTRUCTOR: Dr. Tony Ho; **OFFICE:** N-515; **EMAIL:** zh_ho01@scupi.cn
OFFICE HOURS: MTuWTh 13:30 – 15:30pm at Rm N-515, or by appointment.
LECTURES: Mon: 08:15am – 11:00am at Rm S-205.
RECITATION: N/A
CREDITS: 3 credit hours
TEXTBOOK: *David Poole: Linear Algebra: A Modern Introduction 4th ed.*
TEACHING ASSISTANT: N/A

PREREQUISITE: N/A

DESCRIPTION: Fundamentals of matrices and vectors in Euclidean space. Topics include solving linear systems of equations, matrix algebra, inverses, determinants, eigenvalues and eigenvectors. Also covers the basic notions of span, subspace, linear independence, basis, dimension, linear transformation, range, null space, orthogonality, distance and approximation. Use of the computer software, MATLAB, will be an integral part of this course.

COURSE OBJECTIVES:

- Students will become familiar with scholarly and research methods.
- Students will develop effective written communication skills.

LEARNING OUTCOMES FOR THIS COURSE: 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 do the following –

- Perform matrix and vector operations and find vector norms.
- Find the eigenvalues and eigenvectors of matrices with real coefficients
- Find bases for the range and null space of matrices with real coefficients
- Interpret geometrically properties of matrices such as eigenvalues, eigenvectors, null space, and range
- Determine if a set of vectors is linearly independent, orthogonality, or form a basis for a vector space
- Prove that a set of vectors is a subspace including the range and null space of a linear transformation
- Verify and prove the rank plus nullity theorem
- Classify matrices as symmetric, Hermitian, normal, or unitary
- Find the orthogonal complement of a subspace in a finite dimensional vector space.

GRADE: The final grade will be based on the **score**. The score is a number determined by **Attendance: 5% Homework/Quizzes: 20% Major Exams: 45% Final: 30%**

The final letter grade is determined from the following table.

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: [60 – 62]	F: < 60

EXAMS: There are three major monthly tests and a final exam. Each major test will emphasize material since the previous exam but may include anything covered previously. Each test may earn bonus points if the following test score is higher. The bonus is half of the difference of the two exams. There is no bonus for the final exam, but the lowest adjusted test score may be replaced by the final exam score if the final is higher. Here is an example: if a student's grades are: attendance (12/15), HW / quiz(80), tests (72, 76, 70), and final (90), then the adjusted test scores will be 74, 76, 70; the lowest adjusted test score 70 is replaced by 90. Thus, the student grade determination is $5 \times (12/15) + 80 \times 20\% + (74+76+90)/3 \times 45\% + 90 \times 30\% = 83$ which is a B+. The final exam will be comprehensive. There is NO Make up for all the exams.

Tentative exam dates are the following:

TEST 1: 04/11	TEST 2: 05/10	TEST 3: TBD	FINAL: 06/29
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QUIZZES: In-class 10-minutes quiz will be given on some lecture days and recitation classes.

RECITATION: N/A

GRADE REBUTTAL: You must retrieve your own exam and quiz papers. For any exam or quiz, you have only one week to request corrections. No corrections will be made after a week after the test paper is returned.

HOMEWORK: There will be a graded homework assignment given on each section covered. They must be handed in before due date. **No late homework will be accepted.** I will collect them and grade some problems. Homework solutions will be provided after the due date.

ATTENDANCE: You are expected to attend all the classes; We will follow Sichuan University's policy for attendance, and we will check attendance for every class. If you miss a third of all semesters' classes, then you may receive a 0-score for this semester's grade. A student who misses a class is responsible for finding out what was covered in the class.

MAKE-UP POLICY: **No makeup work will be allowed.** The dropped grade in each test period is to account for any missed assignments due to illness or any other circumstances.

CODE OF ACADEMIC CONDUCT: All students in attendance at the Sichuan University are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct.

NON-ACADEMIC MISCONDUCT: All cell phones and other electronic devices are to be turned off and out of sight while you are in the classroom. All newspapers and other materials not related to the class are to be put away once class begins. Operating these devices and reading unrelated materials while in class is disrespectful of your instructor and fellow classmates. If you fail to abide by this rule, the instructor has the right to confiscate the device or materials. If you have an emergency and need to have your phone turned on during class, ask your instructor for permission.

MATERIAL COVERED: Tentative Progress:

Week	Contents	Descriptions
1 (03/09)	2.1 – 2.2	Systems of Linear Equations, Direct Method for Solving Linear Systems
2 (03/16)	2.3 – 2.4	Spanning Sets and Linear Independence, Applications
3 (03/23)	3.1 – 3.2, 2.5	Matrix Operations, Matrix Algebra, Jacobi's Iterative Methods for Solving Linear Systems
4 (03/30)	2.5, 3.3 – 3.4	Gauss-Seidel's Iterative Methods for Solving Linear Systems, The Inverse of a Matrix, LU Factorization
5 (04/06)		Exam 1
6 (04/13)	3.4 – 3.6	LU Factorization, Subspaces, Basis, Dimension, and Rank, Linear Transformations
7 (04/20)	3.7, 4.2	Applications, Determinants
8 (04/27)	4.1, 4.3 – 4.4	Eigenvalues and Eigenvectors, Similarity and Diagonalization
9 (05/04)		Labor Day Holiday, Exam 2
10 (05/11)	4.6, 5.1 – 5.2	Applications, Orthogonality, Orthogonal Complements
11 (05/18)	5.2 – 5.3	Orthogonal Projections, The Gram-Schmidt Process
12 (05/25)	5.3 – 5.4	QR Factorization, Orthogonal Diagonalization of Symmetric Matrices
13 (06/08)	5.5, 6.3	Applications, Change of Basis, Exam 3
14 (06/15)	7.2 – 7.3	Norms and Distance Functions, Least Squares Approximation
15 (06/22)	7.4	The Singular Value Decomposition
16 (06/29)		In-class final exam