

MATH 2418.HN - Spring 2025
Honours Linear Algebra
Course Syllabus

- **Class Time** M & W 5.30-6.45 pm
- **Classroom:** SCI 3.240
- **Modality** Face to face

- **Instructor Office & Email:** FO 2.408 C; vish@utdallas.edu
- **Office Hours:** M 2.30-3.30pm. These office hours are nominal. Students can meet me at other times. To do so first converge upon a mutually convenient time & then send me a reminder 24 hours in advance. Please also see the information about the optional session below.
- **Grader** Mr. Mahesh Ranpati Dewage; mkr200000@utdallas.edu

Optional Problem Session Starting January 31st, I will hold weekly, on every Friday, an optional problem session from 12-1 pm in FO 2.404. Though optional this session has been very beneficial to students. It serves as an interactive office hour.

Mandatory Problem Session: Each student must be registered in Math 2418.398 which is the so-called recitation section for this course. All quizzes and two of the examinations for this course will be held during this problem session. Unlike the optional session, this problem session will be conducted by the TA.

Grades and the Like:

- *Attendance:* 5 %. Attendance will be called at times not announced in advance.
- *HW:* 25 %. HWs must be returned in person to me (unless otherwise indicated) **ONLY** at times (i.e., day and time of day) indicated on the HW. HWs cannot be returned either before or after the time indicated.
- *3 Midterm Examinations:* Worth 20 % each. The first will take place on Feb 26th, 2025; the second on April 2nd, 2025; and the third on May 7th, 2025 The first two will be held during the mandatory problem session and last 90 minutes each. The third will be held in class and is 75 minutes long. Exams are closed book. No notes or electronic devices are permitted. Cellphones etc., must be turned off.
- **Quizzes** 10 %. Of the 11 quizzes, your best 10 will be picked for determining your quiz performance. All quizzes will be held during the problem session. Dates for the quizzes are indicated below.

Dates for quizzes:

- January: 29th.
- February: 5th, 12th, 19th.
- March: 5th, 12th, 26th.
- April: 9th, 16th, 23rd, 30th

Grading Scale: ≥ 98 $A+$; $[92, 98)$: A ; $[87, 92)$: $A-$; $[84, 87)$ $B+$; $[80, 84)$ B ; $[77, 80)$: $B-$; $[74, 77)$: $C+$; $[70, 74)$: C ; $[67, 70)$: $C-$; $[62, 67)$: $D+$; $[58, 62)$: D ; $[53, 58)$: $D-$; < 53 : F

Syllabus & Learning Outcomes:

- Basic Matrix Algebra; Various types of matrix products and their uses;
- Schur complements and their use in matrix inversion and positivity;
- Gaussian elimination and applications, especially to the 4 fundamental subspaces.
- Vector spaces; bases and dimension; Linear Maps; Rank-nullity theorem.
- Inner products, orthogonal projections and their uses in least squares.
- Eigenvalues, diagonalization; Schur triangularization; spectral theorem; SVD and applications.
- Orthogonal polynomials with emphasis on the Chebyshev polynomials.
- Time permitting: Basics of tensors.

Textbooks: Class notes which will be made available on elearning. Other reading materials will be suggested as the course progresses.

Generalities: Cheating will not be tolerated; ample decorum must be maintained in the classroom.