

Course Syllabus

Linear Systems and Matrices (Math 260)

- Description:** *Students will study properties of, and solutions to, linear equations and system of linear equations. Related topics include matrices, properties of matrices, matrix algebra, determinants, eigenvalues, real vectors in two and three dimensions, vector algebra (including dot and cross products), linear combinations, and linear independence. This class is not open to students with credit for MATH 264.*
- Credit Hours:** 1
- Audience:** Required for biochemistry, chemistry (ACS certified), engineering, meteorology majors. Either/or prerequisite (with Math 264) for MATH 270, 322, STAT 344, DATA 374, CE 351, ECE 455, ME 355, 364, 369, 405, 442, 440, 460, BE 369.
- Prerequisites:** MATH 111, or placement higher than MATH 111 in the Math Placement process. (May be taken concurrently.)
- Format:** 1 lecture (50 min) per week when full semester, or 1 lecture (50 min) plus required time on-line when hybrid half-semester
- Textbook:** *Introductory Notes in Linear Algebra for the Engineers*, by Finan (Required) available freely online at <http://faculty.atu.edu/mfinan/LINENG.pdf>
- Software:** Use of *Maple* is recommended (available on campus computers; purchase of student version is recommended).
- Internet:** Course material and grades are often maintained in Blackboard, at the discretion of the instructor.
- Accommodations:** The Access & Accommodations Resource Center (AARC) is the campus office that works with students to provide access and accommodations in cases of diagnosed mental or emotional health issues, attentional or learning disabilities, vision or hearing limitations, chronic diseases, or allergies. You can contact the office at aarc@valpo.edu or 219.464.5206. Students who need, or think they may need, accommodations due to a diagnosis, or who think they have a diagnosis, are invited to contact AARC to arrange a confidential discussion with the AARC office. Further, students who are registered with AARC are required to contact their professor(s) if they wish to exercise the accommodations outlined in their letter from the AARC.
- Notice of Cancellation:** In the event class is cancelled, you will be notified through your Valparaiso University e-mail account.
- Emergencies:** VU's Emergency Notification System (ENS) uses multiple forms of communication, including e-mail, building alarms, outdoor sirens, message boards, computer alerts, Twitter, and public address messaging. Please review the specific procedures for this class found in Blackboard. Remember: "Siren inside, GO outside; Siren outside, GO inside." To evacuate, gather your personal belonging quickly and proceed to the nearest exit. Do not use the elevator. To shelter in place, move away from the windows and stay low to the ground; lock or barricade the door if there is a threat of violence.

Student Learning Objectives:

- A. Students can perform exact procedures for finding solutions to problems of linear algebra.
- B. Students understand fundamental concepts of linear algebra.
- C. Students prepare for success in disciplines which rely on linear algebra, and in more advanced mathematics which incorporate linear algebra, such as differential equations, optimization, and numerical analysis.

Topics & Performance Requirements Include (but are not limited to):

1. defining and identifying systems of linear equations
2. understanding fundamental concepts of matrix algebra and performing calculations using matrices
3. understanding concepts related to vector spaces, including subspaces, spanning, linear independence, basis, and dimension
4. finding and interpreting eigenvalues and eigenvectors of a system of linear equations
5. finding and interpreting solutions to systems of linear equations
6. solving systems of linear equations using matrix techniques
7. identifying when certain theorems apply, and if not, identifying what hypothesis is violated
8. checking results (produced both manually and with technology) and recognizing those which are obviously false
9. recognizing alternate forms of a correct result
10. using proper mathematical notation and vocabulary
11. writing clear and detailed solutions to assigned problems