

VIRGINIA STATE UNIVESITY
SCHOOL OF ENGINEERING, SCIENCE, AND TECHNOLOGY
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
MATH 325 - LINEAR ALGEBRA 3 SEMESTER HOURS

COURSE SYLLABUS: SPRING 2009

Instructor's Name: Dr. George W. Wimbush **Office:** 301Sa HM **Ext:** 5293

Instructor's E-mail address: gwimbush@vsu.edu

Section: 01 **Course Meeting Days, Time & Place:** 0500-0620 TR 204S HM

Instructor's Scheduled Office Hours:

Monday	Tuesday	Wednesday	Thursday	Friday
10 – 12:00	4:00 – 4:50 PM	10-12:00	4- 4:50 PM	10-12:0 0; By Appointment Only 3 – 5 PM

COURSE DESCRIPTION:

This is an introductory course in linear algebra designed for students who are majoring in mathematics, computer science, engineering, economics, or science. In this course, the main theory of linear algebra with examples, applications, and geometric interpretations will be discussed. Theoretical proofs and computer applications will be emphasized. Microcomputer software and graphing calculators will be used to perform large numerical and symbolic computations.

Course Text: **Lawson, Edwards & Falvo, Sixth Edition, Elementary Linear Algebra, Houghton Mifflin Company, Boston, 2009.**

Course Prerequisite: **MATH 200 – Calculus I or MATH 212 – Intro to Calculus**

Learning Outcomes, Activities, and Evaluation Strategies.

After completing the course, the student will:

1. **Knowledge**

- a. Define the system of linear equations.
- b. Define elementary row operations and echelon forms.
- c. Define the addition, subtraction and multiplication of matrices.
- d. Define the determinant of a matrix.

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- e. Define the adjoint of a matrix.
- f. Write the formula for the inverse of a matrix.
- g. Define elementary matrix.
- h. Define vectors.
- i. Define a vector space.
- j. Define spanning set.
- k. Define linear independence of vectors.
- l. Define basis of a vector space.
- m. Define dimension of a vector space.
- n. Define rank of a matrix.
- o. Define Linear Transformation.

2. Skills

- a. Determine whether a given system of linear equations has a solution.
- b. Find the solution of a system of linear equations by row operations.
- c. Calculate the sum, difference and product of matrices.
- d. Calculate the determinant of a matrix.
- e. Calculate the adjoint of a matrix
- f. Calculate the inverse of a matrix.
- g. Determine whether a given set of vectors form a vector space.
- h. Determine whether a given set of vectors form a spanning set.
- i. Determine whether a given set of vectors are independent.
- j. Find the basis and dimension of a vector space.
- k. Find the rank of a matrix.
- l. Find the kernel and range of a linear transformation.

3. Abilities

- a. Assess the type of matrix technique that is needed to appropriately solve a system of equations.
- b. Choose an appropriate technique to find the solution.
- c. Interpret a real-life situation in the form of a system of linear equations.
- d. Apply vectors spaces in identifying and sketching the graph of an equation.

COURSE REQUIREMENTS:

1. Attend class regularly and on time, coming in late or leaving Early should be avoided.
2. Eating and drinking are not permitted in the classroom.
3. Phones and pages are to be turned off during class.
4. Turn in written home assignments by the due date.
5. Purchase and read the required text and related material.
6. Purchase and learn to effectively use a TI-83/84/89/92 graphing calculator.
7. Participate actively in class problem solving exercises.
8. Perform satisfactorily on examinations.
9. Students who are covered under the American Disability Act should privately inform the teacher of this fact so that appropriate instructional arrangements can be made for the student. All university policies specified in the Student Handbook regarding cheating, plagiarism, absenteeism, etc., will be strictly enforced.

EVALUATION AND GRADING:

The average of all tests and other class activities during the first half of the semester will count $\frac{2}{3}$ of the midterm grade. The midterm examination will count $\frac{1}{3}$ of the midterm grade. For the final grade: the midterm grade will count $\frac{1}{3}$; the average of all work done after the midterm (tests, assessments, etc.) will count $\frac{1}{3}$ and the grade on the final examination will count $\frac{1}{3}$ of the final grade. The grading scale is: A (90 – 100); B (80 – 89); C (70 – 79); D (60- 69); F (59 and below).

Extra Credit: Selected Lab Exercises from Hill & Zitarelli's Lab Manuel(See below) using MATLAB software may be turned in for extra credit toward the midterm and final grade.

Resources for Students:

Student Solution Manuel; Learning Tools CD-ROM; Website for Elementary Linear Algebra, Fifth Edition(math.college.hmco.com), Chapter summaries at the end of each chapter, MATHLAB exercises.

Hill, D. R. and Zitarelli, D.E. **Linear Algebras Labs with Matlab**, Third Edition, Pearson Prentice Hall, Upper Saddle River, NJ, 2003

Course Bibliography:

- Anton, Howard, Elementary Linear Algebra, Ninth Edition, John Wiley and Sons, Inc., 2005.
- Chen, K., Giblin, P. and Irving, A. Mathematical explorations with Matlab, Cambridge University Press, 1999.
- Kolman, B. and Hill, D.R. Elementary Linear Algebra with Applications, Ninth Edition, Pearson Prentice Hall, N. J., 2008.
- Hardy, Kenneth, Linear Algebra for Engineers and Scientists Using MatLab, Pearson Prentice Hall, 2005
- Szabo, Fred. Linear Algebra – An Introduction Using Maple. Harcourt Academic Press, San Diego, CA, 2002
- Williams, Gareth, Linear Algebra with Applications, 5th Edition, Jones And Bartlett Publishers, 2004.

CONTENT OUTLINE

MATH 325-01 Linear Algebra

SPRING 2009

CHAPTER 1: Systems of Linear Equations

Sections: 1.1, 1.2, 1.3

Test 1 February 3, 2009

CHAPTER 2: MATRICS

Sections: 2.1, 2.2, 2.3, 2.4, 2.5

Test 2 February 24, 2009

