

MTH 177—Linear Algebra

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I. Course Description

Covers matrices, vector spaces, determinants, solutions of systems of linear equations, and eigen values. Designed for mathematical, physical and engineering science programs.

Prerequisites: a placement recommendation for Math 177, and four units of high school mathematics including Algebra I, Algebra II, Geometry, and Trigonometry or equivalent.

Co-requisite: MTH 175.

Lecture: 2 hours per week.

II. Instructional Materials

Textbook: A Brief Introduction to Matrices and Vectors, Preliminary Edition, Arnold, Johnson, and Riess, ©Addison Wesley, 1998, published by Virginia Tech Available online at <http://www.emporium.vt.edu/math1114/> (Lesson Pages)

Calculator: Scientific Calculator, TI-30X or similar
Calculators with Matrix capabilities will *not* be used on in-class tests.

III. Resources

This course closely parallels Virginia Tech's Math 1114.

There are additional resources available at <http://www.emporium.vt.edu/math1114/>

Additional resource materials for some New River Community College classes can be found on the NRCC Web-based learning site at nr.edu/learninglinks.

IV. Course Objectives

Upon successful completion of this course the student should be able to

1. Solve application problems by interpreting the materials presented, including determining the nature and extent of the information needed, and present the answer in standard English.
2. Estimate and consider answers to mathematical problems in order to determine reasonableness.
3. Use Gauss-Jordan elimination.
4. Identify consistent and inconsistent systems of equations.
5. Transform a matrix into Reduced Echelon Form.
6. Find all solutions to homogenous systems of equations.
7. Perform matrix addition and multiplication.
8. Identify Identity and Zero Matrices.

9. Raise a matrix to a power.
10. Identify vectors in \mathbb{R}^n .
11. Solve the matrix equation $AX = B$.
12. Find the inverse of a matrix.
13. Find the determinant of a matrix.
14. Find the transpose of a matrix.
15. Distinguish between physical, geometric, and algebraic vectors.
16. Determine the relationship between physical, geometric, and algebraic vectors.
17. Find scalar multiples of a vector.
18. Determine unit vectors.
19. Write vectors in three dimensions.
20. Find the dot product of vectors.
21. Find the cross product of vectors.
22. Determine Eigenvalues and Eigenvectors.
23. Apply Eigenvalues and Eigenvectors.
24. Perform the arithmetic of complex numbers.
25. Apply complex Eigenvectors.

V. Course Procedures

Schedule: You will be given a schedule with the text material to be covered on each class meeting day and the dates of the Chapter Tests. Every attempt will be made to keep to this schedule, however if it becomes necessary to alter the schedule, an announcement will be made in class, and a new schedule will be published. An announcement will also be published in Blackboard.

Attendance: The NRCC attendance policy will be followed. For details see the current New River Community College Catalog. There are no excused or unexcused absences. Students are responsible for any information missed when they are absent, including any changes in the schedule. Attendance will be monitored closely. Class attendance is considered to be an essential component in learning mathematics. NRCC's policy states that the instructor may withdraw you if you are absent for the equivalent of two week's worth of classes; this includes absences due to illness and emergency.

Homework: The homework assigned in the textbook will not be collected or graded. You will be responsible for completing and understanding all of the assigned homework problems. Time will be given during class to go over the homework problems.

VI. Evaluation

Quizzes: There will be weekly quizzes in the class. The quiz may cover anything we have done in the class since the last test.

Tests: At the completion of each chapter there will be an in-class, written Chapter Test. A missed test will be recorded as a 0 (zero). There will be no makeup given for a missed test.

Final Exam: The Final Exam is comprehensive over all the material covered in the course. The score on the Final Exam may be used to replace the lowest Test score if the Final Exam percentage is higher than the lowest Test score.

Course Grade: Your Course Average will be determined by your performance on the graded components of the course:

Quizzes	16%
Tests	64%
Final Exam	20%

Grades will be assigned from your Course Average:

<u>Course Average (%)</u>	<u>Grade</u>
90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
Below 60	F

Get help as soon as you are having difficulty. Do not wait until you are completely lost to get help!

VII. Academic Integrity

It is expected that all work completed in this course is the result of effort by the student registered in the course. If it is determined that the student has cheated by obtaining unauthorized assistance on any of the graded components of the course, the student will receive an "F" for the course.

VIII. Special Needs

If you are a student with a documented disability who will require accommodations in this course, please register with the Disability Services Office located in the Counseling Center for assistance in developing a plan to address your academic needs. Please also feel free to talk with the Instructor about any concerns you may have.

IX. Diversity Statement

The NRCC community values the pluralistic nature of our society. We recognize diversity including, but not limited to, race, ethnicity, religion, culture, social class, age, gender, sexual orientation and physical or mental capability. We respect the variety of ideas, experiences and practices that such diversity entails. It is our commitment to ensure equal opportunity and to sustain a climate of civility for all who work or study at NRCC or who otherwise participate in the life of the college.

X. E-mail Policy

If you send me an e-mail, you should include a **descriptive** subject line. Please remember to use complete sentences and follow the rules of grammar. Do not expect a prompt reply to your e-mails concerning last minute questions about an exam the next day.

XI. Withdrawal Statement

Student Initiated Withdrawal Policy

A student may drop or withdraw from a class without academic penalty during the first sixty percent (60%) of a session. For purposes of enrollment reporting, the following procedures apply:

- a. If a student withdraws from a class prior to the termination of the add/drop period for the session, the student will be removed from the class roll and no grade will be awarded.
- b. After the add/drop period, but prior to completion of sixty percent (60%) of a session, a student who withdraws or is withdrawn from a course will be assigned a grade of "W." A grade of "W" implies that the student was making satisfactory progress in the class at the time of withdrawal, that the withdrawal was officially made before the deadline published in the college calendar, or that the student was administratively transferred to a different program.
- c. After that time, if a student withdraws from a class, a grade of "F" or "U" will be assigned. Exceptions to this policy may be made under documented mitigating circumstances if the student was passing the course at the last date of attendance.

A retroactive grade of "W" may be awarded only if the student would have been eligible under the previously stated policy to receive a "W" on the last date of class attendance. The last date of attendance for a distance education course will be the last date that work was submitted.

Late withdrawal appeals will be revised and a decision made by the Director of Student Services.

Instructor Initiated Withdrawal Policy

A student who adds a class or registers after the first day of class is counted absent from all class meetings missed. Each instructor is responsible for keeping a record of student attendance in each class.

Students who have not attended class or picked up/accessed distance learning materials by the last day to drop class and receive a refund must be withdrawn by the instructor during the following week. No refund will be applicable.

Since attendance is not a valid measurement for Distance Education (DE) courses, students may be withdrawn due to non-performance. Students should refer to his/her DE course plan for the instructor's policy.

When a student's absences equal twice the number of weekly meetings of a class (equivalent amount of time for summer session), the student may be dropped for unsatisfactory attendance in the class by the instructor.

When an instructor determines that absences constitute unsatisfactory attendance, an Instructor Withdrawal Form should be completed and submitted to the Admissions and Records Office within five days of when the student met the withdrawal criteria. The last date of attendance must be documented. A grade of "W" will be recorded during the first sixty percent (60%) period of a course. Students withdrawn after the sixty percent (60%) period will receive a grade of "F" or "U" except under documented mitigating circumstances when a letter of appeal has been submitted by the student. A copy of this documentation must be placed in the student's academic file.

The student will be notified of the withdrawal by the Admissions and Records Office. An appeal for reinstatement into the class may be approved only by the instructor.