NEW RIVER COMMUNITY COLLEGE
DUBLIN, VIRGINIA

COURSE PLAN

Course Number and Title**:** MTH 177 - Linear Algebra

Prepared by: Math Department Fall, 2013
(Date)

Approved by: _____ _____
(Dean) (Date)

I. Course Description

Covers matrices, vector spaces, determinants, solutions of systems of linear equations, and eigenvalues. 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.

II. Introduction

This course covers matrix representation to solve systems of equations. Additional techniques of matrix manipulation are covered.

III. Student Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Use Gauss-Jordan elimination
2. Identify consistent and inconsistent systems of equations.
3. Transform a matrix into Reduced Echelon Form.
4. Find all solutions to homogenous systems of equations.
5. Perform matrix addition and multiplication.
6. Identify Identity and Zero Matrices.
7. Raise a matrix to a power.
8. Identify vectors in R^n.
9. Solve the matrix equation AX = B.
10. Find the inverse of a matrix.
11. Find the determinant of a matrix.
12. Find the transpose of a matrix.
13. Distinguish between physical, geometric, and algebraic vectors.
14. Determine the relationship between physical, geometric, and algebraic vectors.
15. Find scalar multiples of a vector.
16. Determine unit vectors.
17. Write vectors in three dimensions.

18. Find the dot product of vectors.
19. Find the cross product of vectors.
20. Determine Eigenvalues and Eigenvectors.
21. Apply Eigenvalues and Eigenvectors.
22. Perform the arithmetic of complex numbers.
23. Apply complex Eigenvectors.

IV. Instructional Methods

The instructional methods include lectures, homework, quizzes, reviews and in class tests. Further information is available in the Course Plan Addendum.

V. Instructional Materials

Textbook: A Brief Introduction to Matrices and Vectors, Preliminary Edition, Arnold, Johnson, and Riess, ©Addison Wesley, 1998, published by Virginia Tech

This course closely parallels Virginia Tech's Math 1114. The textbook is currently out of print. Some copies may be available through used book sources. The recommend source for the textbook for this course is the free electronic copy of the textbook available at http://www.emporium.vt.edu/math1114/ . Use of the online textbook, and other materials from the website is approved and authorized by Virginia Tech.

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

VI. Course Content

- Matrices and matrix manipulations
- Elementary row operations
- Gauss Jordan elimination
- Matrix inverse, determinant and transpose
- Dot product
- Cross product
- Eigenvalues and eigenvectors

VII. Evaluation

The grade for the course will be calculated from Homework, Quizzes and Tests. See the Course Plan Addendum for details.

VIII. Attendance

Regular attendance at classes is required. When absence from a class becomes necessary, it is the responsibility of the student to inform the instructor prior to the absence whenever possible. The student is responsible for the subsequent completion of all study missed during an absence. Any instruction missed and not subsequently completed will necessarily affect the grade of the student regardless of the reason for the absence.

IX. Cheating Policy

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 registered for the course has cheated by obtaining unauthorized assistance on any of the graded components of the course, the student will receive an "F" for the course.

X. Withdrawal Policy

Student Initiated Withdrawal Policy

A student may drop or withdraw from a class without academic penalty during the first 60 percent 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 60 percent of a session, a student who withdraws from a class 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 reviewed and a decision made by the Director of Student Services.

No-Show Policy

A student must either attend face-to-face courses or demonstrate participation in distance learning courses by the last date to drop for a refund. A student who does not meet this

deadline will be reported to the Admissions and Records Office and will be withdrawn as a no-show student. No refund will be applicable, and the student will not be allowed to attend/participate in the class or submit assignments. Failure to attend or participate in a course will adversely impact a student's financial aid award.

Instructor Initiated Withdrawal

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 (face-to-face classes) or performance/participation (DE classes) in each class throughout the semester.

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.

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

In accordance with the No-Show Policy, a student who has not attended class or requested/accessed distance learning materials by the last day to drop the class and receive a refund must be withdrawn by the instructor during the following week. No refund will be applicable.

When an instructor withdraws a student for unsatisfactory attendance (face-to-face class) or non-performance (DE class), the last date of attendance/participation will be documented. Withdrawal must be completed within five days of a student's meeting the withdrawal criteria. A grade of "W" will be recorded during the first sixty percent (60%) period of a course. A student 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 of reinstatement into the class may be approved only by the instructor.

XI. Disability and Diversity Statements

If you are a student with a documented disability who will require accommodation 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.

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.