

**COLLIN COUNTY COMMUNITY COLLEGE DISTRICT
COURSE SYLLABUS**

COURSE NUMBER: Math 2373

COURSE TITLE: Matrices, Vectors, and Linear Programming

CREDIT HOURS: 3 **LECTURE HOURS:** 3 **LAB HOURS:** 0 **CLN/REC:** 0

ASSESSMENTS:

Prior to enrolling in this course, the student must demonstrate eligibility to enroll in the following: MATH 1316, MATH 1325, MATH 1350, or MATH 2373.

PREREQUISITE: Math 1314 or Math 1414

COREQUISITE: None

TEXTBOOK:

Linear Algebra with Applications, 6th ed., Gareth Williams, © 2008 by Jones and Bartlett Publishers, Inc.

SUPPLIES: Graphing calculator required

COURSE DESCRIPTION:

Not for science majors. A study of matrices, vectors, determinants, inverses, system of linear equations, and linear programming with applications.

COURSE MEASURABLE LEARNING OBJECTIVES:

Upon completion of this course the students should be able to do the following:

1. Solve systems of linear equations with applications using, Gauss Jordan elimination, matrix inverse, and determinants.
2. Perform basic operations on vectors, determinants and inverses.
3. Determine if a set of vectors is linearly independent and whether it forms a basis for a vector space.
4. Solve linear Programming problems by using the geometrical approach method and the Simplex Method
5. Solve problems from operation research in business and economics.

COURSE REQUIREMENTS:

Attending lectures, completing assignments, completing required exams, and a basic knowledge of calculator use are all required.

COURSE FORMAT:

Lecture and guided practice

METHOD OF EVALUATION:

A minimum of four written exams and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY:

Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw.

RELIGIOUS HOLY DAYS:

In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office.

COURSE REPEAT POLICY:

All students may repeat this course only once after receiving a grade, including W. For example students who have taken this course twice have to choose a different course to take after two trials.

ADA STATEMENT:

It is the policy of Collin County Community College to provide reasonable and appropriate accommodations for individuals with documented disabilities. This College will adhere to all applicable Federal and State laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS Office (G-200) or 972.881.5898, (TDD 972.881.5950) in a timely manner if he/she desires to arrange for accommodations.

ACADEMIC ETHICS:

The college may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of material as one's own work that is not one's own. Scholastic dishonesty may involve one or more of the following acts: cheating, plagiarism, collusion, and/or falsifying academic records.

Cheating is the willful giving or receiving of information in an unauthorized manner during an examination, illicitly obtaining examination questions in advance, using someone else's work for

assignments as if it were one's own, copying computer disks or files, and any other dishonest means of attempting to fulfill the requirements of a course.

Plagiarism is the use of an author's words or ideas as if they were one's own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation. Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the CCCCD Student Handbook.

COURSE CONTENT:

Module 1: Systems of Linear Equations

The student will learn about:

1. Matrices and Systems of Linear Equations
2. Gauss-Jordan Elimination Method

Module 2: Matrices

The student will learn about:

1. Addition, Scalar Multiplication, and Multiplication of Matrices
2. Properties of Matrix Operations
3. Symmetric Matrices and Seriation in Archaeology
4. The Inverse of a Matrix and Cryptography
5. The Leontief Input-Output Model in Economics
6. Markov Chain, Population Movements, and Genetics
7. Communication Model and Group Relations in Sociology

Module 3: Determinants

The student will learn about:

1. Computing Determinants of 2×2 and 3×3 Matrices
2. Properties of Determinants
3. Matrix Inverses and Systems of Linear Equations

Module 4: General Vector Spaces

The student will learn about:

1. Vectors, Dot Product, Norm, Angle, and Distance
2. Vector Spaces and Subspaces
3. Linear Combination of Vectors
4. Linear Dependence and Independence
5. Bases and Dimension of Vectors
6. Rank of a Matrix
7. Inner Product Space application: Least Squares Curves

Module 5: Numerical Techniques

The student will learn about:

1. The Gaussian Elimination Method

Module 6: Linear Programming

The student will learn about:

1. Linear Programming Concepts
2. The Simplex Method
3. Geometrical Explanation of the Simplex Method