



## **Curriculum Description for St. Francis Baccalaureate**

### **MATHEMATICS 319 - LINEAR ALGEBRA**

#### **Course Description:**

Study of systems of linear equations, matrices, determinants, vector spaces, eigenvalues, and eigenvectors. Credit 3 hours.

**Prerequisites:** MATH 110 *College Algebra* (or equivalent)

#### **Outcomes:**

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

- Solve systems of linear equations using matrices
- Use matrices to organize and manipulate data
- Perform the matrix operations of addition, multiplication, and scalar multiplication
- Compute the inverse, adjoint, transpose, and determinant of a matrix
- Define the concepts of linear transformation, vector space, subspace, and inner product space
- Perform the vector operations of addition, dot product, scalar multiplication, and cross product
- Solve problems from a variety of disciplines using vector concepts
- Define and determine the eigenvalues and eigenvectors of a square matrix
- Construct mathematical models which describe practical applied problems from a variety of disciplines, solve the models using the techniques of linear algebra, and interpret the mathematical solutions as they relate to the applied problems
- Identify the contributions to the development of linear algebra made by prominent mathematicians
- Learns as to how matrices are used in real life situations
- Learns to use Microsoft Excel or MatLab or some other software to solve linear equations.

#### **Instructional Methodologies:**

Classes will consist (primarily) of lectures. Computer/calculator assignments will be used to perform vector and matrix operations and solve systems of linear equations.

**Textbook:** *Elementary Linear Algebra*, 5<sup>th</sup> edition, R. Larson, B. Edwards and D. Falvo.

**Course Content:**

- Chapter 1: Systems of Linear Equations (all sections)
- Chapter 2: Matrices (all sections)
- Chapter 3: Determinants (except sections 3.4)
- Chapter 4: Vector Spaces (sections 4.1 to 4.6)
- Chapter 5: Inner Product Spaces (sections 5.1 to 5.3)
- Chapter 7: Eigenvalues and Eigenvectors (sections 7.1 and 7.4)

**Course Requirements:**

- **Attendance:** Class attendance is strongly recommended and vigorously encouraged. In addition, students will be responsible for any announcements made in class, whether or not they are present.
- **Homework:** Since homework is an integral part of this course, assignments will be made on a regular basis. You can (and are encouraged to work on homework with other students in the class. However simply copying another student's homework is strongly discouraged (negative consequences of this academic strategy are usually experienced during quizzes and examinations). Also, knowing that one is capable of solving a problem is not sufficient, what is required is that one should be able to solve the problem and express in the language of mathematics. Hence the student is strongly encouraged to write down complete solutions to the homework problems. Homework will be graded and carries a weight of 100 points out of a total of 550 points.
- **Quizzes:** All quizzes will be closed book and closed-note. Quizzes will be loosely based on the assigned homework and the lectures. A total of four quizzes will be given during the semester. Everyone's lowest quiz score will be dropped at the end of the semester. If due to an emergency or an official college activity, you cannot take a quiz, please notify the instructor prior to the quiz.
- **Final exam:** The final exam will be closed-book and closed-note. The final will be comprehensive. The final exam time will not be changed except in cases of verifiable emergencies. If you cannot take the final exam at the scheduled time, please notify the instructor prior to the exam.

**Evaluation:** There will be four quizzes and one final exam. The lowest quiz score will be dropped from evaluation. Course grades will be based on three quizzes (100 points each), Homework (100 points), and the final exam (150 points) for a total of 550 points. Course grades based on a scale of 1 to 100 will be assigned as follows:

GRADING WILL BE BASED ON PERCENTAGES AS FOLLOWS:

95-100 A+  
90-94 A  
85-89 A-

80-84 B+  
75-79 B  
70-74 B-

65-69 C+  
60-64 C  
55-59 C-

50-54 D+  
45-49 D  
40-44 D-  
< 40 F

**Policy Regarding Academic Integrity:** Academic honesty according to the Academic Integrity Policy is expected in this class for all work submitted for a grade and will be strictly followed. Students are responsible for understanding and following this policy.