MAT-228: LINEAR ALGEBRA

Time Stamp:
Tue Jun 11 2024 14:44:57 GMT-0500 (CDT)

Approval Path

a. Wed, 28 Feb 2024 19:19:21 GMT
Alexis Thurman (athurman): Approved for MATH Chair
b. Wed, 28 Feb 2024 22:20:33 GMT
Aslihan Cakmak (acakmak): Approved for BMET Dean
c. Tue, 09 Apr 2024 12:54:45 GMT
John Soltes (jsoltes): Approved for General Education Committee Chair
d. Mon, 22 Apr 2024 16:45:48 GMT
Christine Kelly (ckelly): Approved for Curriculum Committee Chair
e. Tue, 23 Apr 2024 12:54:29 GMT
Patrick Enright (penright): Approved for VPAA
f. Tue, 21 May 2024 19:06:11 GMT
Joanne Hugues (jhugues): Approved for College Council Chair
g. Wed, 22 May 2024 14:53:10 GMT
Shew-Mei Chen (schen): Approved for Academic Services (Datatel Entry)

Date Submitted: Mon, 12 Feb 2024 20:45:46 GMT

Last edit: Tue, 02 Apr 2024 16:51:01 GMT

Course Type:
Credit

Credit Type:
Institutional

Course Prefix:
MAT

Course Number:
228

Course Capacity:
28

General Education?
Yes

Department:
Mathematics (MATH)

Division:
School of Business, Mathematics, Engineering and Technologies

Course Title:
Linear Algebra

Effective Date:
Fall 2024

Credit Hours:
Lecture: 3
Lab:
Recitation:
Clinical:
Cooperative:
Studio:
TOTAL: 3

Catalog Credits:
3

Course Fee:
No

General Education Information
Categories:
Mathematics

Category Learning Outcomes Which Will Be Achieved:
Use quantitative analytical skills to evaluate and to process numerical data.

Catalog Course Description:
Selected topics including matrices and determinants, vectors and vector spaces, linear transformations, eigenvalues and eigenvectors, with applications from a variety of disciplines.

Catalog Prerequisites:
MAT-131 (grade of C or better) or equivalent

Crosslisted
No

Textbooks:

Title	Ed	Author(s)	Publisher	ISBN	Req/Rec
Elementary Linear Algebra		Larson, Falvo	Cengage		Required

Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations:
(Information will be used to determine differential funding category.)

Course Content:

Topics
Linear systems of equations; elementary operations
Gauss elimination method; homogeneous systems
Introduction to matrices; elementary row operations
Scalar multiplication, addition, multiplication of matrices; transpose; properties
Vectors; subspaces; linear dependence and independence; basis; review
Elementary operations and rank; null space; nullity; elementary matrices
Inverse of a matrix; properties
Full-rank factorization and LU-decomposition of a matrix
Determinants; properties, cofactors and the inverse of a matrix; Cramer’s Rule; review
Eigenvalues, eigenvectors; characteristic equation
Properties of eigenvectors; diagonalization
Inner products; orthogonality; Gram-Schmidt process
Diagonalization of symmetric matrices, applications
Least-squares solution; review
Vector spaces
Linear transformations and matrices; properties

Statement of Course Learning Outcomes:

Learning Outcomes

Identify and solve linear systems of equations using Gaussian elimination
Define and manipulate matrices and apply factorization techniques
Define and utilize determinants and apply them to solve systems of equations using Cramer's Rule
Explain and apply the Least-Squares approximation process
Define, describe and interpret vector spaces and linear transformations between spaces
Define, interpret and calculate eigenvalues and eigenvectors

Statement of Relation to Curriculum(s):

MAT-228 is a specialized elective in the Mathematics Education Specialization program and may be used as a free elective in the Mathematics and the Engineering Science programs.

Format for offering the course:

(check all that apply)

Traditional

Key: 3891