Mathematics (MATH) 270

Linear Algebra I (Revision 7)

Status:	Replaced with new revision, see the **course listing** for the current revision
Delivery mode:	**Individualized study online** with **eText**
Credits:	3
Area of study:	Science
Prerequisite:	None
Precluded:	None
Challenge:	MATH 270 is not available for challenge.
Faculty:	**Faculty of Science and Technology**

Notes:	**Mathematics Diagnostic Assessment** . This online test contains 70 questions that will help you assess your mathematical skills. Based on your score we will recommend which Athabasca University mathematics course you are likely ready to take successfully.

Overview

MATH 270 is suggested for students in the Science programs. The course covers systems of linear equations, matrices, inverse of a matrix, determinant, vectors in two-, three- and n-dimensions, Euclidean and general vector spaces, and applications of linear algebra.

Outline

- Unit 1: Systems of Linear Equations and Matrices

Some of the topics covered in this unit are systems of linear equations, Gaussian and Gauss-Jordan elimination, matrices, their Operations and their Algebraic Properties, and applications to traffic flow and chemical equations.

- Unit 2: Inverse of a Matrix, Linear Systems and Special Forms of Matrices

Some of the topics covered in this unit are inverse of a matrix and its properties, methods for finding the inverse, linear systems and the inverse of a matrix, special forms of matrices and applications to economic systems.

- Unit 3: Determinant of a Matrix

Some of the topics covered in this unit are the determinant with minors and cofactors, determinants by row reduction, properties of the determinant, equivalent statements theorem for an invertible matrix, Cramer's rule, and applications to Geometry.

- Unit 4: EuclideanVector Spaces in 2-, 3-, and n-dimensions

Some of the topics covered in this unit are vector operations and properties, lengths, distances and dot/inner product, orthogonality, vector and parametric equations of lines and planes, cross product, eigenvalues and eigenvectors, applications to dynamical systems, Markov chains.

- Unit 5: General Vector Spaces

Some of the topics covered in this unit are real vector spaces , subspaces , linear independence, basis, dimension, introduction to linear transformations, basic matrix transformations, applications to computer graphics.

Note: Each unit will have a section with a Linear Algebra application.

Learning outcomes

Students who successfully complete the course should be able to

1. solve systems of linear equations using different methods such as Gaussian and Gauss-Jordan elimination, coefficient matrix inversion, and Cramer's rule.
2. calculate basic matrix operations, inverses and determinants, and apply them to systems of linear equations and basic linear transformations.
3. demonstrate understanding of the basic concepts within a vector space, including vectors, vector operations, inner and cross products, subspace, linear independence, span, basis, and dimension.
4. find the eigenvalues and eigenvectors of a square matrix using the characteristic polynomial.
5. use the concepts of matrices, system of linear equations, inverse matrix, determinant, and vector spaces to solve applied Linear Algebra problems.

Evaluation

To **receive credit** for MATH 270, you must achieve a course composite mark of at least **D (50 percent)** with a grade of at least 50 percent on the final examination.

Note: Calculators are not allowed during the examinations.

Activity	Weight
Five Assignments	15%
Midterm Examination	35%
Final Examination	50%
Total	**100%**

To learn more about assignments and examinations, please refer to Athabasca University's **online Calendar** .

Materials

Anton, H., and C. Rorres. *Elementary Linear Algebra: Applications Versions*, 11th ed. NJ: Wiley, 2014. (eText)

Anton, H., and C. Rorres. *Student Solution Manual (to accompany) Elementary Linear Algebra: Applications Versions*, 11 thed. NJ: Wiley. (eText)

eTexts

Registration in this course includes electronic textbooks. For more information on **electronic textbooks** , please refer to our **eText Initiative site** .

Other Materials

The online course materials include a study guide, and a student manual.

Important links

- **Academic advising**

- **Program planning**
- **Request assistance**
- **Support services**

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

Opened in Revision 7, April 6, 2016

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View **previous revision**