



Mathematics (MATH) 271

Linear Algebra II (Revision 6)

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

Prerequisites:

[MATH 270](#)

Precluded:

None

Challenge:

MATH 271 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

Mathematics 271: Linear Algebra II continues the study of linear algebra from *Mathematics 270*. *Mathematics 271* is suggested for students in the science programs. The course covers intermediate topics of linear algebra such as general vector spaces, eigenvalues and eigenvectors, inner product spaces, diagonalization and quadratic forms, and general linear transformations and applications of linear algebra.

Outline

Unit 1: General Vector Spaces

- Some of the topics covered in this unit are vector spaces; subspaces; linear independence; bases and dimension; change of basis; row, column and null spaces; rank and nullity; matrix transformations; and applications to computer graphics in 3D.

Unit 2: Eigenvalues and Eigenvectors

- Some of the topics covered in this unit are eigenvalues and eigenvectors; matrix diagonalization; and applications to genetics.

Unit 3: Inner Product Spaces

- Some of the topics covered in this unit are inner product spaces; orthogonality; Gram-Schmidt process; *QR*-decomposition; and method

of least squares.

Unit 4: Diagonalization and Quadratic Forms

- Some of the topics covered in this unit are orthogonal matrices; orthogonal diagonalization; symmetric matrices; and applications of quadratic forms to conics.

Unit 5: General Linear Transformations



- Some of the topics covered in this unit are general linear transformations; composition and inverse of linear transformations; isomorphism; similarity; and applications to cryptography.

Learning outcomes

Upon successful completion of this course, you should be able to


- demonstrate understanding of general vector spaces, including concepts of subspace, linear independence of vectors, span, bases, change of bases, and dimension, as well as null, row and column spaces.
- find the bases for the eigenspaces of a matrix and understand their use in the process of diagonalizing a square matrix.
- demonstrate understanding of the concepts within general inner product spaces, including distance, orthogonality, orthogonal complement, and orthogonal projections, and apply these concepts to find the least squares polynomial fit to a given set of data points.
- apply the concepts of orthogonal diagonalization and symmetry to the study of quadratic forms and conics.
- demonstrate understanding of the concepts of linear transformations in general vector spaces, isomorphism and similarity; and their relationship to basic concepts of cryptography.

Evaluation


To **receive credit**  for *MATH 271*, you must achieve a composite course grade of at least **D (50 percent)**  and a grade of at least 50 percent on the final examination. The weighting of the composite grade is as follows:


Note: Calculators are not allowed during the examinations.

Activity	Weight
5 Assignments (3% each)	15%
Midterm Exam	35%
Final Exam	50%
Total	100%



To learn more about assignments and examinations, please refer to Athabasca University's [online Calendar](#) .

Materials

Anton, Howard, and Rorres, Chris. *Elementary Linear Algebra: Applications Version* (11th ed.). Hoboken, NJ: Wiley, 2014.  (eText)

Anton, Howard, and Rorres, Chris. *Elementary Linear Algebra: Applications Version, Student Solutions Manual* (11th ed.). Hoboken, NJ: Wiley, 2014.  (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 course materials include a *Study Guide* and *Course Orientation*.

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 6, November 9, 2018

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View [previous revision](#) 
