

This course is intended for students planning to do an honours degree with a concentration in Mathematics or Statistics. It is also recommended for students in other disciplines who want to understand the foundations of linear algebra and matrix theory. The course introduces the basic material that is likely to be needed in any application of linear algebra to fields outside mathematics. It also lays a foundation for further courses in linear algebra as well as in the wide range of mathematical subjects that use vector spaces or similar algebraic structures.

Textbook: *Linear Algebra with Applications*, 3rd Edition
by O. Bretscher, (Pearson/Prentice Hall)

Prerequisite: Grade 12U AFIC *and* GDM.

Exclusions: MATH-111, 112*.

Instructor: M. Roth

Evaluation:	Final Examination	50%
	Midterm Examination	30%
	Homework (out of highest 10 assignments)	20%

Topics:

1. Solving linear equations with matrices
2. Vectors, linear combinations, linear transformations
3. Matrix products, invertible linear transformations, inverse matrices
4. Image and Kernel, subspaces
5. Basis, linear independence, dimension
6. Introduction to proofs
7. Abstract vector spaces
8. Linear recurrence equations
9. Change of Basis
10. Linear differential equations
11. Determinants
12. Iterating Linear Transformations
13. Eigenvalues and Eigenvectors
14. Eigenspaces, Diagonalization
15. Dot product, orthogonal basis
16. Orthogonal projections and the least squares method