

# Applied Linear Algebra

The University of British Columbia – Math 307 Section 921 – May-Jun 2017

- Lectures: M 2pm-3pm and T, W, Th 2pm-4pm in Leonard S. Klink Room 201
- Instructor: Roger Donaldson
- Office hour: M 3pm-4pm Math Room 229A

## Textbook

There is no required textbook for this course. Instead there is a set of typed notes designed for this course, which is available on the [course github site](#).

If you would like to consult a book you may find these useful:

- [Introduction to Linear Algebra by Gilbert Strang](#) (Highly recommended)
- [Linear Algebra and its Applications](#) (also by G. Strang)
- Elementary Linear Algebra with Applications by Howard A. Anton and Chris Rorres

Help is available online for getting started in Matlab, Octave, Python and R. If you are using Matlab or Octave, you may find this [help page on Matlab/Octave](#) useful.

## Outline

The course covers four core topics:

- Linear equations
- Subspaces
- Orthogonality
- Eigenvalues

That said, this course is organized around a collection of applications. Examples include:

- Interpolation
- Finite difference approximations

- Formula matrix of a chemical system
- Least Squares
- Fourier series
- Graphs and Networks
- Fast Fourier Transforms (FFT)
- JPEG compression
- Power method
- Recursion relations
- The Anderson tight binding model
- Markov chains
- Google PageRank

We will study a selection of these applications in this class. Each application will include a discussion of the relevant concepts from linear algebra. These will be partly review from your previous linear algebra course and partly new material. You will do larger linear algebra calculations on a computer.

## Computing Resources

If you wish to use Python or R for computing, one option is the [JupyterHub](#) online computing environment. Log in with your UBC CWL and start writing programs immediately: no prerequisites other than a supported web browser are required.

## Grading Scheme

Your grade will be determined by in-class quizzes, one midterm exam, and the final exam, as follows

- 20% in-class quizzes
- 30% midterm
- 50% final exam

Quizzes will be held in class twice per week.

## Class Policy

No portable electronic devices may be used during lectures.