# Numerical Linear Algebra - MATH4806 [Winter 2021]

**Course Information**

- Course Dates: January 11th to April ?
- Computer Lab.: Monday 10am-11:30am

**Instructor**

- Course Instructor: Emmanuel Lorin (`elorin@math.carleton.ca`, office #4239)

**Assessment**

- Lab.: 50%
- Final Exam: 50%

**References** (*book not required*)

- *Numerical Mathematics*, A. Quarteroni, R. Sacco, F. Saleri
- Programming: `matlab`

**Course Content**

- Short Review: Linear Algebra, `matlab`
- Direct Methods for Solving Linear Systems (Gauss, LU decomposition, Cholesky, ...)
- Linear Iterative Methods for Solving Linear Systems (Jacobi, Gauss-Seidel, SOR, ...)
- Compressed Row Storage for Sparse Matrices
- Introduction to Methods based on Krylov Subspace Iterations
- Conjugate Gradient Method
- Spectral Approximation (Power Method, Givens-Householder, Lanczos, ...)
- If Time (one/two of the following topics could be presented):
  - How To: Use Numerical Linear Algebra Libraries (PETSc, LAPACK, ARPACK, Sparselib, ...)
  - Parallel Matrix-Vector Multiplication with MPI
  - Application: deep learning
  - Preconditioners