

Syllabus for Linear Algebra 101*

1. Vectors

- (a) Vector Spaces
- (b) Subspaces

2. Linear Combinations

- (a) Linear Independence
- (b) Basis
- (c) Coordinates

3. Matrices

- (a) Linear Transformations and Coordinates
- (b) Matrix Arithmetic
- (c) Rank & Nullspace
- (d) $Ax = b$

4. Inner Products

- (a) Angles
- (b) Norms

5. Projections

- (a) Orthogonal Projections
- (b) Least Squares
- (c) Gram-Schmidt

6. Eigen stuff

- (a) Coordinates
- (b) Eigenvalues & Eigenvectors
- (c) $\dot{x} = Ax$ and $x_{k+1} = Ax_k$.
- (d) Characteristic Polynomial

* An ideal prerequisite linear algebra course