Math 2270
Course Content

Linear Algebraic Equations
    Toolkit: Combo, Swap, Multiply
    Elementary Matrix Theorem
    Pivot Theorem
Matrix Equations
Linear Independence
Linear Transformations and Geometry
Matrix Algebra
  LU Decomposition
  Inverse matrix
  Subspace, Dimension, Rank, Nullity
Determinants
  Definition
  Four Evaluation Rules
  Cofactor Expansion
  Cramer's Rule
  Determinant Product Theorem
  Adjugate Identity
Vector Spaces
  Definition of a vector
  Subspaces
  Basis
  Null space, kernel, column space, row space
  Fundamental Theorem of Linear Algebra (Strang's paper)
  Coordinates, change of basis
  Dimension and Rank
  Markov chains
Eigenanalysis
  J B Fourier's 1822 heat problem and the history of Eigenanalysis
  Algebraic eigenanalysis: eigenvalue and eigenvector
  Diagonalization theory and Fourier's model
  Matrix Model Simplification by Eigenanalysis
Orthogonality and Least Squares
  Inner product spaces
  Orthogonality, angle, orthonormal sets
  Shadow projection and orthogonal projections
  Gram-Schmidt orthonalization algorithm
  Near Point theorem
  Least Squares theorems
Symmetric matrices and quadratic forms
  Symmetric matrix diagonalization theory
  Quadratic forms and positivity
  Optimization
  Singular Value Decomposition
Fundamental Theorem of Linear Algebra
  Perp-Subspace Identities
  The 4 Fundamental Subspaces
  Geometry of the SVD