First Semester Area B

CSE 383C/CS 383C/M 383E/ME 397, Numerical Analysis: Linear Algebra

1. Review of Linear Algebra
   1.1. Solution of linear systems and LU decompositions
   1.2. Orthogonality, projections, and QR decompositions
   1.3. Eigenvalues and SVD decompositions

2. Direct Numerical Linear Algebra
   2.1. Stability, conditioning, and convergence: backward error analysis and well-posedness
   2.2. LU and Cholesky decompositions
   2.3. QR and SVD decompositions

3. Iterative Methods
   3.1. Krylov subspace methods
   3.2. Conjugate gradient method and preconditioning

4. Some Applications
   4.1. Eigenvalue problems
   4.2. Banded and sparse matrices
   4.3. Least square problems using QR and SVD decompositions