- Vector spaces, subspaces, independence, span, bases, dimension
  - Suggested review: homework #2-#3.
  - Suggested reading: lecture notes 1.1-1.5.
- Linear transformations, kernel and image, nullity-rank, one-to-one and onto maps, isomorphisms
  - Suggested review: homework #4.
  - Suggested reading: lecture notes 2.1-2.3.
- Matrices associated to linear transformations, rank and inverses, similarity, change of basis
  - Suggested review: homework #5.
  - Suggested reading: lecture notes 2.4.1-2.4.4.
- Inner products, norms, orthogonality, Gram-Schmidt, orthogonal complements and projection, adjoints
  - Suggested review: homework #6-#7, homework #8 problem 8, homework #10 problem 4.
  - Suggested reading: lecture notes 3.1-3.4.
- Eigenvalues and eigenvectors, eigenspaces, characteristic polynomial, similarity and diagonalization
  - Suggested review: homework #8 problems 1-7, homework #9 problem 6.
- Generalized eigenvectors and the Jordan canonical form.
  - Suggested review: homework #9 problems 3, 4, 7
- Cayley-Hamilton, matrix powers, systems of differential equations, Hermitian operators, spectral theorem
  - Suggested review: homework #9 problems 2, 5, 8, homework #10 problems 2, 5, 6
- Bilinear forms, matrix congruence, diagonalization of bilinear forms
  - Suggested review: homework #10 problems 3, 7, 8, homework #11 problems 2, 6.
  - Suggested reading: lecture notes 5.1, Lecture 29.
- Quadratic forms and their relationship to bilinear forms, diagonalization over \(\mathbb{R}^n\) via spectral theorem
  - Suggested review: homework #11 problems 3(ab), 4(ab), 5,
  - Suggested reading: lecture notes 5.2.1-5.22, Lecture 30.
- Quadratic varieties, second derivatives test, Sylvester’s law of inertia, signature and index, positive-definiteness
  - Suggested review: homework #11 problems 3(cde), 4(cde), 7, 8.
  - Suggested reading: lecture notes 5.2.2-5.2.4, Lectures 30-31.
- True/false and miscellaneous tidbits
  - Suggested review: homeworks #2-#11 problem 1.