

## Syllabus. Math 131. Linear Algebra.

*Linear Algebra. J.B. Fraleigh and R.A. Beauregard. The third edition.*

- Vectors, matrices and systems of linear equations. (*Sections 1.1 – 1.6.*)
  - Euclidean vectors, dot product and norm,
  - matrices and their algebra,
  - solving systems of linear equations,
  - elementary matrices, inverses of square matrices,
  - homogeneous systems, their solution sets.
  
- Dimension, rank and linear transformations. (*Sections 2.1 – 2.4.*)
  - Independence and dimension,
  - rank of a matrix,
  - linear transformation of vector spaces.
  
- Vector spaces. (*Sections 3.1 – 3.5.*)
  - The abstract notion of vector space,
  - generalization of linear algebraic concepts from ordinary vector algebra,
  - coordinatization of vector spaces,
  - linear transformations,
  - inner product spaces.
  
- Determinants. (*Sections 4.1 – 4.4.*)
  - Determinants of general square matrices,
  - computation of the determinants,
  - Cramer’s rule,
  - relation of the determinants to areas, volumes, and cross products.