
SYLLABUS FOR MATH 580A3:

LINEAR ALGEBRA FOR DATA SCIENCE II:

GEOMETRIC TECHNIQUES FOR DATA REDUCTION

FALL19: THIS 1 CREDIT COURSE IS AVAILABLE VIA CSU FACE-TO-FACE (CRN 83746) WEEKS 1-5. IT IS ALSO OFFER VIA CSU ON-LINE FOR DISTANCE STUDENTS SECTION 801 (CRN 83628) WEEKS 6-10.

INSTRUCTOR INFORMATION

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Prerequisites: M581A2 or MATH 369.

Lecture Topics

1. The Projection Matrix and its application to data sets.
2. Hyperplanes, dot products and classification.
3. Data modeling with $Ax=b$, a geometric perspective.
4. Determinants.
5. Eigenvalues and eigenvectors.
6. The characteristic polynomial.
7. Change of basis, similarity.
8. Diagonalization
9. Spectral theorem for symmetric matrices
10. Principal component analysis
11. Eigenbases and data reduction
12. Properties of PCA
13. Introduction to the Singular Value Decomposition
14. Image analysis and the SVD
15. Data interpretation of the SVD and subspaces