**Math 222: Linear Algebra with Applications**

**Time**  MTWThF 1:00p - 2:15p  
**Instructor**  James Barnes  
**Email**  j.barnes@yale.edu  
**Office hours**  THD

**TA Email Office Office Hours**  
TBD

**Course Description:** This course is an introduction to the subject of Linear Algebra, a common language applied to a wide variety of real-world situations involving many variables. The concepts of linear algebra are extremely useful in physics, economics, social sciences, natural sciences, engineering, and data analysis (e.g. Google’s search algorithm). Math 222 will blend applications of the subject to these other areas with computational aspects, and a gentle introduction to the main conceptual ideas. The goal is not only to teach about linear algebra itself, but to use it as a prototype of mathematical thinking.

**Prerequisites:** MATH 115 or equivalent.

**Text:** Nicholson: Open Linear Algebra With Applications

**Grading:** The overall grade in the course will be determined via a mix of the following kinds of assignments.

- Regular problem sets.
- Skill-based quizzes.
- Review tests.
- Final exam.

You can collaborate with other students in the class to solve the problems. However, for written homework, solutions must be written up on your own.

Late homework assignments will not be accepted for any reason.

**Expectations:** You are expected to attend every class and to arrive on time. It is your responsibility to keep informed of any announcements, syllabus adjustments, or policy changes made during scheduled classes.

**Syllabus:** This course is undergoing some curriculum development. Practically, this means we are trying out a new version of the course, and depending on time and other constraints we may not reach all of these content goals.
• Vectors and matrices
• Linear equations and Gaussian elimination
• Inverses, transposes and permutations
• Vector spaces
  – Linear Independence
  – Nullspace, rank
  – Linear Transformations
• Orthogonality, projections, least squares, Gram-Schmidt
• Determinants
• Eigenvalues, Diagonalization, Similar matrices
• Singular value decomposition

Syllabus Adjustments: Elements of this syllabus may be adjusted as necessary during the course of the class.