

Math 46 (Honors)

Linear Algebra
Course Information

Spring 2009

BLOCK: Block H+: Tuesday and Thursday 1:30–2:45

INSTRUCTOR: Misha Kilmer

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OFFICE: Bromfield-Pearson 113

OFFICE HOURS: (Fall 2008) On leave

PHONE: 7-2005

PREREQUISITES: Math 12 or 17 or consent.

TEXT: *Sheldon Axler, Linear Algebra Done Right, 2nd ed.*

COURSE DESCRIPTION:

This is the “honors” section of Math 46. We will stress the development of abstract concepts and the proofs of theorems. There will be less emphasis on matrix computations. If you want to know the *why* as well as the *how* behind linear algebra, this is the course for you. There will be a strong emphasis on proofs rather than calculations. If you want to learn more about proofs and higher mathematics, this is the course for you. The course is intended for majors or minors in mathematics, science and engineering. While the emphasis of the course will be different, the material is still the material of Math 46 - done from a more abstract viewpoint.

Linear algebra is used in essentially all fields of mathematics, and in applications as diverse as imaging, operations research, and signal processing. You will use it again and again in your later math courses as well.

You will certainly learn to solve linear systems of equations using matrices in this course, however, this will be done in connection with how these systems arise in the abstract setting of linear transformations on vector spaces. The main topics covered in the course include: vector spaces, subspaces, linear independence, basis, and dimension. The course then proceeds to study linear transformations and their associated matrices and properties such as rank, null space, trace, and determinant. Finally, eigenvalues/eigenvectors, diagonalizability, and invariant subspaces are covered and if time permits there are a number of other topics to choose from.