MATH 3407, Advanced Linear Algebra
Semester 2, 2019
Class Overview

This information is approximate and is released only to help you make preregistration decisions. Everything is subject to change before the start of the semester.

The class is roughly divided into two parts:

1. First five weeks: the basics, done the "adult way": more abstract, without numbers and row-reduction;
2. Other eight weeks: further topics (these contain calculations).

Below is a quick comparison of this class with Math 2207 (Introductory Linear Algebra); for simplicity, not all topics in each class are listed.

Math 2207 (Introductory)	Math 3407 (Advanced)
Vector spaces, mostly finite-dimensional: $\mathbb{R}^n$, matrices, polynomials; scalars: $\mathbb{R}$	More unusual vector spaces, including infinite-dimensional; scalars: $\mathbb{R}$, $\mathbb{C}$, ...
Linear combinations of vectors; subspaces	Combining subspaces
Study linear transformations through its standard matrix	Study linear transformations abstractly, without matrices
Eigenvectors and diagonalisation: $A = PDP^{-1}$	Triangular form and Jordan form for non-diagonalisable matrices: $A = PJP^{-1}$
	Linear forms (functions: vector space $\to \mathbb{R}$)
Orthogonality and dot product (in $\mathbb{R}^n$)	Quadratic forms and inner product spaces (of abstract vectors)

Be aware that the notation is different from Math 2207; in particular, vectors will be denoted by Greek letters $\alpha, \beta, \ldots$, without arrows nor bold print. To save writing time, you are expected to be familiar with the shorthands:
$\forall$ (for all),
$\exists$ (there exists),
$\Leftrightarrow$, "iff" (if and only if).