

## Advanced Linear Algebra. Syllabus

### I. Lectures 1-13. Material for the Midterm

The midterm will be on **Wednesday, February 14th**, and will cover all topics discussed in the first 14 lectures and 5 discussion sessions (Wednesday, January 3 – Tuesday, February 6; Axler Chapters 1–3). It will include problems that require operations with complex numbers as well as questions where you are asked to prove a statement. In the latter case, your argument will have to be correct, complete, and properly written in order to receive full credit.

In preparation for the midterm, make sure you know all definitions, theorems and propositions we discussed in class. For this please review the chapters in Axler as well the handouts posted on the class website. It is also a good idea to go over Homeworks 1-5.

Lecture	Topics	Notes & Remarks
1	What is Linear Algebra?	Notes
2	Complex Numbers	Notes on Complex Numbers
3	Complex Numbers	
4	Fundamental Theorem of Algebra	Notes on FTA
5	Vector Spaces, Subspaces	Axler pp 4–14 + Notes
6	(Direct) Sums, Span	Axler pp 14–17 + Notes
7	Linear Independence, Bases	Axler 2.1–13 + Notes
8	Dimension	Axler 2.14–18 + Notes
9	Linear Maps	Axler p 37–41
10	Null Space, Range	Axler 3.1–6
11	Matrix of a Linear Map	Axler pp 48–53
12	More on Matrices	
13	Invertibility	Axler pp 53–58