

Vv417 Linear Algebra

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UM-SJTU Joint Institute

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Contents

1	Introduction	3
1.1	Course Profile	3
1.1.1	Contact Information	3
1.1.2	Grading Policy	3
1.1.3	Honour Code	3
1.1.4	Teaching Schedule	4
1.1.5	Textbook	5
1.1.6	Matlab	5

Vv417 Linear Algebra

1 Introduction

1.1 Course Profile

1.1.1 Contact Information

- **Instructor:**
Jing Liu
- **Lectures:**
Monday (16:00 – 17:40) in **F-311** Odd weeks only
Tuesday (16:00 – 17:40) in **F-312**
Thursday (16:00 – 17:40) in **F-315**
- **Office Hours:**
Tuesday/Thursday (12:30pm – 03:30pm) in **JI-Building 441A**
Tuesday/Thursday (05:40pm – 06:40pm) in **E2-204**
- **Email:**
`stephen.liu@sjtu.edu.cn`
When sending an email related to this course please include the tag [vv417] in the subject e.g. Subject: [vv417] Special Request
- **Teaching Assistant/s:**
See Canvas for his/her contact information

1.1.2 Grading Policy

- **Assignment:**
30% Assignments will be given in the form of problem sets, and may require extra reading and the use of Matlab. Bonus can be and only be credited to and between assignments, and it cannot be used to exceed the full grade.
- **Exam:**
70% There will be three exams:

Midterm I	Midterm II	Final
20%	20%	30 %
- For this course, the grade will be curved to achieve a median grade of “B”.

1.1.3 Honour Code

- Assignments/projects are to be solved by each student individually. You are encouraged to **discuss** problems with other students, but you are advised **not to show your written work** to others. Copying someone else’s work is a very serious violation of the honour code.

- Students may read resources on the Internet, such as articles on Wikipedia, Wolfram MathWorld or any other forums, but you are **not allowed** to post the original assignment question online and ask for answers. It is regarded as a violation of the honour code.
- Since it is impossible to list all conceivable instance of honour code violations, the students has the responsibility to always act in a professional manner and to seek clarification from appropriate sources if their or another student's conduct is suspected to be in conflict with the intended spirit of the honour code.

1.1.4 Teaching Schedule

Week	Topics
1	Introduction Gaussian Elimination Matrix Multiplication
2	Invertible Matrices Diagonal, Triangular, Symmetric and Block Matrices
Mid-Autumn Festival	
3	Determinant The LU Factorisation
4	National Holiday
5	Sparse System Vector Spaces, Subspaces and Spanning sets Linear Independence
First Midterm Exam	
6	Fundamental Subspaces
7	Basis and Dimension Rank and Nullity Isomorphism
8	Homomorphism Change of Basis
9	Dual spaces Metric, Normed and inner Product Spaces
Second Midterm Exam	
10	Orthogonality Orthogonalization
11	Applications: Least Squares Eigenvalues and eigenvectors Similarity
12	Applications: Page Ranking Complex Scalars
13	Hermitian, Unitary, and Normal Matrices Single Value Decomposition Positive Definite Matrices
14	Final Exam

1.1.5 Textbook

- Gilbert STRANG, [Introduction to Linear Algebra \(4th edition\)](#)
- Some Additional Material:
 - Otto BRETSCHER, [Linear Algebra with Applications \(5th edition\)](#)
 - David LAY, [Linear Algebra and its Applications \(3rd edition\)](#)
 - Jim HEFFERON, [Linear Algebra \(3rd edition\)](#)
- More Advanced Material:
 - Stephen FRIEDBERG, [Linear Algebra \(4th edition\)](#)
 - Sheldon AXLER, [Linear Algebra Done Right \(2nd edition\)](#)
 - Kenneth HOFFMAN and Ray KUNZE, [Linear Algebra \(2nd edition\)](#)

1.1.6 Matlab

- Students are strongly encouraged to get acquainted with a computer algebra system and use it to experiment with the topics discussed in the class. Free software for both symbolic and numerical calculations (e.g. Maxima, Octave) are available, along with commercial tools such as [Matlab](#) .
- What is Matlab?

It is a software used by millions of engineers and scientists.
- What does it do?

It is designed to help you solve equations and manipulate expressions with minimal programming. It is particularly good at doing matrix operations.
- How to get Matlab

Matlab is installed on all computers in the JI Computer Lab.
You can also install Matlab on your own computer.

 1. Register your name at [MathWorks](#) [using your sjtu email](#)
 2. Download
 3. Activate

Detailed instructions can be found at [JI's IT-page](#) .