

## 18.06 Linear Algebra, Spring 2015

**Lecturer:** Gilbert Strang (office E17-420, email: [gs@math.mit.edu](mailto:gs@math.mit.edu) )  
**Lecture hour:** Monday, Wednesday, Friday 11am, room 10-250  
**Course Administrator:** Carlos Sauer (office: E18-401P, email: [csauer@math.mit.edu](mailto:csauer@math.mit.edu))

\* \* **Website:** Check the course website [web.mit.edu/18.06/](http://web.mit.edu/18.06/) periodically for problem sets, practice exams, problem set and exam solutions, announcements, information on your recitation section, and all other course information. The website includes links to

- **Gradebook and Membership modules**, where you can view your grades and change your recitation section,
- **Piazza** ([piazza.com/mit/spring2015/1806/home](http://piazza.com/mit/spring2015/1806/home)), where you can ask and answer questions.

\* \* **Textbook:** *Introduction to Linear Algebra (4th edition)* by Gilbert Strang. Previous editions can be hard to use precisely because there small differences especially in the problem sets.

\* \* **Recitations:** All recitations are on Tuesday. You must be enrolled in a specific section (they are listed on [web.mit.edu/18.06/](http://web.mit.edu/18.06/)). Your homework and exams should go to that section. You can change your section through the Membership module.

\* \* **Problem Sets:** Homework will be posted weekly in the Problem Sets section of the website. Assignments will be due on Thursdays **by 4PM** and returned in the next recitation. Please staple the pages together, clearly write your name, your recitation section, the name of your recitation instructor on your problem set solutions and put them in the box for your section in E17-131. Late homework will not be accepted and no extensions are granted. The lowest score will be dropped.

\* \* **Cooperation policy:** The homeworks are essential in learning linear algebra. They are not a test and you are encouraged to talk to other students about difficult problems—after you have found them difficult. Talking about linear algebra is healthy. But you must write your own solutions and list your collaborators on the problem set.

\* \* **Exams:** There will be three one-hour exams (*in Walker*) at class times on:

- Monday March 2
- Friday April 10
- Monday May 4

Students will not be excused if they are signed up for two classes at the same time. The 18.06 exam must be taken during the 18.06 class time. The use of calculators or notes is not permitted during the exams.

\* \* **Grading:** Problem sets 15%, three one-hour exams 45% (15% each), final exam 40%.

\* \* **MITx:** Each of the homework will contain a part on MITx. Please log into [lms.mitx.mit.edu](http://lms.mitx.mit.edu) to complete these parts.

\* \* **Questions:** Concerns about grades, homework, exams: talk to **your recitation instructor** (not the lecturer). If you have a question about lecture material, methods to solve a particular type of problem, etc., then please post it on Piazza. Your classmates and/or instructors will reply with suggestions or hints. Also, please do not hesitate to ask questions during lectures and recitations

# Syllabus for 18.06 Linear Algebra, Spring 2015

MWF 11–12    Room 10-250

*Text: Introduction to Linear Algebra, 4th Edition, Gilbert Strang*

The three midterm exams will be held during lecture hours in WALKER (closed book).  
**NO MAKE UP EXAMS.**

L1	W 2/04	The Geometry of Linear Equations	1.1–2.1
L2	F 2/06	Elimination with Matrices	2.2–2.3
L3	M 2/09	Matrix Operations and Inverses	2.4–2.5
L4	W 2/11	Transposes and Permutations, $A = PLU, P^T = P^{-1}$	2.6 2.7
L5	F 2/13	Vector Spaces and Subspaces	3.1
L6	T 2/17	Column Space and Nullspace: Solving $Ax = 0$	3.2
L7	W 2/18	$Ax = b$ for nonsquare $A$ , Row-reduced Echelon Form	3.3–3.4
L8	F 2/20	Independence, Dimension, and Bases	3.5
L9	M 2/23	The Four Fundamental Subspaces	3.6
L10	W 2/25	The Big Picture	Notes
L11	F 2/27	EXAM REVIEW	
L12	M 3/02	<b>Exam 1: 1-3.6</b>	
L13	W 3/04	Graphs and Networks	8.2
L14	F 3/06	Orthogonality [ <b>ADD DATE</b> ]	4.1
L15	M 3/09	Projections and Subspaces	4.2
L16	W 3/11	Least Squares Approximations	4.3
L17	F 3/13	Orthonormal Bases, Gram-Schmidt, and $A = QR$	4.4
L18	M 3/16	Fourier Series and Orthogonal Polynomials	8.5
L19	W 3/18	Properties of Determinants	5.1
L20	F 3/20	Formulas for Determinants; Jacobians	5.2–5.3
	3/23-27	<i>Spring Break</i>	
L21	M 3/30	Eigenvalues and Eigenvectors	6.1
L22	W 4/01	Diagonalization and Powers of $A$	6.2
L23	F 4/03	Markov Matrices	8.3
L24	M 4/06	Differential Equations	6.3
L25	W 4/08	EXAM REVIEW	
L26	F 4/10	<b>Exam 2: 1-6.2</b>	
L27	M 4/13	Symmetric Matrices	6.4
L28	W 4/15	Positive Definite Matrices	6.5
L29	F 4/17	Similar Matrices. Jordan Form	6.6
	M 4/20	<i>Patriots Day</i>	
L30	W 4/22	Singular Value Decomposition [ <b>DROP DATE 4/23</b> ]	6.7
L31	F 4/24	Matrices in Engineering	8.1
L32	M 4/27	Linear Transformations	7.1–7.2
L33	W 4/29	Choice of Basis	7.3
L34	F 5/01	Complex Matrices and FFTs	10.1-10.3
L35	M 5/04	<b>Exam 3: 1-7.2</b>	
L36	W 5/06	Probability and Covariance Matrices	Notes
L37	F 5/08	Linear Programming	8.4
L38	M 5/11	Numerical Linear Algebra	9.1–9.3
L39	W 5/13	Course Review	
M–F	5/18–22	<b>Final Exam Period</b>	

**Note:** before each exam, we will announce the specific topics and questions.