

## Linear Algebra and Matrix Methods (Spring 2018 schedule)

Textbook: Gilbert Strang, *Introduction to Linear Algebra, Fifth Edition* (ISBN 978-09802327-7-6)

Each week, I will assign homework assignments from the text. Solutions are available online; the point of you doing the homework is to understand the material. Please complete homework assignments BEFORE reading the solutions, and do not merely turn in copies of the solution sets; otherwise the homework is nearly useless for your learning.

There will be a quiz after each chapter; the lowest quiz grade will be dropped.

We will have two midterm exams. At the end of the course, we will have a two-hour final exam.

**NOTE:** This schedule is subject to change.

Book Chapter	Sections	Homework Problems, Evaluations
Ch 1: Intro to Vectors	<b>Preliminary Materials: Course Layout, Set Theory Notation</b> 1.1 Vectors and Linear Combinations 1.2 Lengths and Dot Products 1.3 Matrices	1.1 #2-9, 15-21, 26 1.2 #1-10, 12-14, 23, 27, 29 1.3 #1-6 <b>Quiz #1: Wed, Feb 7 (class #4)</b>
Ch 2: Solving Linear Equations	2.1 Vectors and Linear Equations 2.2 The Idea of Elimination 2.3 Elimination Using Matrices 2.4 Rules for Matrix Operations 2.5 Inverse Matrices 2.6 Elimination = Factorization: $A = LDU$ 2.7 Transposes and Permutations	2.1 #1-20 2.2 #1-16 2.3 #1-10, 16-18, 24, 25, 27 2.4 #1, 3, 5-8, 15-17 2.5 #1-15 2.6 #1-12 2.7 #1-10, 16-20 <b>Quiz #2: Tue, Feb 20 (class #6)</b> <b>Exam #1: Mon, Feb 26 (class #8)</b>
Ch 3: Vector Spaces and Subspaces	3.1 Spaces of Vectors 3.2 The Nullspace of $A$ : Solving $Ax = 0$ and $Rx = 0$ 3.3 The Complete Solution to $Ax = b$ 3.4 Independence, Basis and Dimension 3.5 Dimensions of the Four Subspaces	3.1 #1-6, 9-14, 19-22 3.2 #1-4, 15-21, 28 3.3 #1-5, 7, 8 3.4 #1-5, 7, 9, 11, 15, 17, 18 3.5 #1-5, 8-11 <b>Quiz #3: Mon, Mar 12 (class #12)</b>
Ch 4: Orthogonality <b>Spring Recess</b> <b>Mar 30-Apr 8</b>	4.1 Orthogonality of the Four Subspaces 4.2 Projections 4.3 Least Squares Approximations 4.4 Orthonormal Bases and Gram-Schmidt	4.1 #4-11, 16-21, 24, 28, 29 4.2 #1-7, 13-18 4.3 #1-5, 12-15, 21, 22 4.4 #1-7, 13-15 <b>Quiz #4: Wed, Mar 28 (class #17)</b> <b>Exam #2: Mon, Apr 16 (class #19)</b>
Ch 5: Determinants	5.1 The Properties of Determinants 5.2 Permutations and Cofactors 5.3 Cramer's Rule, Inverses, and Volumes	5.1 #1-4, 6-10, 13-16, 22 5.2 #1, 2, 5, 11, 12, 20, 23 5.3 #1-4, 6, 8, 9, 12 <b>Quiz #5: Wed, Apr 25 (class #22)</b>
Ch 6: Eigenvalues and Eigenvectors	6.1 Introduction to Eigenvalues 6.2 Diagonalizing a Matrix 6.4 Symmetric Matrices (skipping 6.3) 6.5 Positive Definite Matrices <b>Final Exam Review</b>	6.1 #1-6, 13, 16, 18, 19 6.2 #1-7, 11, 12, 15 6.4 #1-11 6.5 #1-3, 7, 9, 10, 15, 18 <b>Quiz #6: Wed, May 9 (class #26)</b>
<b>FINAL EXAM</b>	<b>Thu, May 17</b>	<b>FINAL EXAM</b>