

EECS 127/227A

Welcome to EECS 127/227A!

- Lectures are recorded in [this YouTube playlist](#).
- If you have problems accessing the recordings, make sure you're logged into your Berkeley account on YouTube.

Course Calendar

Readings posted next to each lecture use the abbreviations:

- CEG, which stands for the textbook *Optimization Models* by Calafiore and El Ghaoui;
- BV, which stands for the textbook *Convex Optimization* by Boyd and Vandenberghe.

Note: calendar not finalized and subject to change.

[Jump to current week.](#)

Week 1

Aug 26: **DISCUSSION 0 RELEASED** [Problems PDF](#) - [Solutions PDF](#)

Aug 25: **LECTURE 1** Introduction and Least Squares - CEG Ch. 1
[Recording](#) - [Slides](#)

Aug 26: **HOMEWORK 1 RELEASED** [Problems PDF](#)

Week 2

Aug 30: **LECTURE 2** Linear Algebra Review: Vector CEG Ch. 2, Ch. 3
 Norms, Gram-Schmidt and QR, Fundamental
 Theorem of Linear Algebra - [Recording](#)

Aug 31: **DISCUSSION 1** [Problems PDF](#) - [Solutions PDF](#)

Sep 1: **LECTURE 3** Linear Algebra Review: Symmetric CEG Ch. 4
 Matrices - [Recording](#)

DISCUSSION 1 [Problems PDF](#) - [Solutions PDF](#)

Sep 2: **DISCUSSION 1** [Problems PDF](#) - [Solutions PDF](#)

- HOMEWORK 1 DUE

Solutions PDF
- HOMEWORK 1 SELF-GRADES RELEASED

Gradescope
- HOMEWORK 2 RELEASED

Problems PDF - Problems Jupyter

Week 3

- Sep 6:

LECTURE 4

Principal Component Analysis - Recording - Jupyter

CEG Ch. 5
- Sep 7:

DISCUSSION 2

Problems PDF - Solutions PDF
- Sep 8:

LECTURE 5

SVD and Low-Rank Approximation - Recording

CEG Sec. 5.3
Wikipedia article

DISCUSSION 2

Problems PDF - Solutions PDF
- Sep 9:

DISCUSSION 2

Problems PDF - Solutions PDF

HOMEWORK 1 SELF-GRADES DUE

HOMEWORK 2 DUE

Solutions PDF - Solutions Jupyter

HOMEWORK 2 SELF-GRADES RELEASED

Gradescope

HOMEWORK 3 RELEASED

Problems PDF - Problems Jupyter

Week 4

- Sep 13:

LECTURE 6

Low-Rank Approximation - Recording

CEG Sec. 5.3
Wikipedia article
Note on Eckart-Young
- Sep 14:

DISCUSSION 3

Problems PDF - Solutions PDF
- Sep 15:

LECTURE 7

Vector Calculus - Recording

BV Appendix A.4

DISCUSSION 3

Problems PDF - Solutions PDF
- Sep 16:

DISCUSSION 3

Problems PDF - Solutions PDF

HOMEWORK 2 SELF-GRADES DUE

HOMEWORK 3 DUE

Solutions PDF - Solutions Jupyter

HOMEWORK 3 SELF-GRADES RELEASED

Gradescope

HOMEWORK 4 RELEASED

Problems PDF

Week 5

Sep 20:	LECTURE 8	Ridge Regression - Recording - Jupyter	CEG Ch. 6
Sep 21:	DISCUSSION 4	Problems PDF - Problems Jupyter - Solutions PDF	
Sep 22:	LECTURE 9	Connections: Ridge, PCA, MLE - Recording - Jupyter	CEG Ch. 6
Sep 23:	DISCUSSION 4	Problems PDF - Problems Jupyter - Solutions PDF	
	HOMEWORK 3 SELF-GRADES DUE		
	HOMEWORK 4 DUE	Solutions PDF	
	HOMEWORK 4 SELF-GRADES RELEASED	Gradescope	
	HOMEWORK 5 RELEASED	Problems PDF	
Week 6			
Sep 27:	LECTURE 10	Convexity - Recording	CEG Sec. 8.1, 8.2, 8.3 BV Ch. 4
Sep 28:	DISCUSSION 5	Problems PDF - Solutions PDF	
Sep 29:	LECTURE 11	Convexity - Recording - Notes	CEG Sec. 8.1, 8.2, 8.3 BV Ch. 4
Sep 30:	DISCUSSION 5	Problems PDF - Solutions PDF	
	HOMEWORK 4 SELF-GRADES DUE		
	HOMEWORK 5 DUE	Solutions PDF	
	HOMEWORK 5 SELF-GRADES RELEASED	Gradescope	
	HOMEWORK 6 RELEASED	Problems PDF	
Week 7			
Oct 4:	LECTURE 12	Descent Methods - Recording	CEG Sec. 12.2
Oct 5:	DISCUSSION 6	Problems PDF - Solutions PDF	
Oct 6:	LECTURE 13	Descent Methods and Convex Optimization - Recording	CEG Sec. 12.2
Oct 7:	DISCUSSION 6	Problems PDF - Solutions PDF	

HOMEWORK 5 SELF-GRADES DUE

HOMEWORK 6 DUE [Solutions PDF](#)

HOMEWORK 6 SELF-GRADES RELEASED [Gradescope](#)

HOMEWORK 7 RELEASED [Problems PDF](#) - [Problems Jupyter](#) - [Solutions PDF](#) - [Solutions Jupyter](#)

Week 8

Oct 11: **LECTURE 14** Bonus Lecture: Principal Components Regression, Total Least Squares - [Recording](#)

Oct 12: **MIDTERM** [Exam Instructions](#) - [Review Session Recording](#) - [Problems PDF](#) - [Solutions PDF](#)

Oct 13: **LECTURE 15** Weak Duality - [Recording](#) CEG Sec. 8.5
BV Ch. 5

Oct 14: **HOMEWORK 6 SELF-GRADES DUE**
HOMEWORK 8 RELEASED [Problems PDF](#)

Week 9

Oct 18: **LECTURE 16** Strong Duality - [Recording](#) CEG Sec. 8.5
BV Ch. 5

Oct 19: **DISCUSSION 8** [Problems PDF](#) - [Solutions PDF](#)

Oct 20: **LECTURE 17** KKT, Optimality Conditions - [Recording](#) BV Sec. 5.5

Oct 21: **DISCUSSION 8** [Problems PDF](#) - [Solutions PDF](#)
HOMEWORK 8 DUE [Solutions PDF](#)
HOMEWORK 8 SELF-GRADES RELEASED [Gradescope](#)
HOMEWORK 9 RELEASED [Problems PDF](#) - [Problems Jupyter](#)

Week 10

Oct 25: **LECTURE 18** KKT, Formulating Optimization [Problems](#) - [Recording](#) BV Sec. 5.5

Oct 26:	DISCUSSION 9	Problems PDF - Solutions PDF	
Oct 27:	LECTURE 19	LPs - Recording	CEG Ch. 9
Oct 28:	DISCUSSION 9	Problems PDF - Solutions PDF	
	HOMEWORK 8 SELF-GRADES DUE		
	HOMEWORK 9 DUE	Solutions PDF - Solutions Jupyter	
	HOMEWORK 9 SELF-GRADES RELEASED	Gradescope	
	HOMEWORK 10 RELEASED	Problems PDF	

Week 11

Nov 1:	LECTURE 20	QPs - Recording	CEG Ch. 9, 10
Nov 2:	DISCUSSION 10	Problems PDF - Solutions PDF	
Nov 3:	LECTURE 21	SOCs and Newton's Method - Recording	CEG Ch. 12
Nov 4:	DISCUSSION 10	Problems PDF - Solutions PDF	
	HOMEWORK 9 SELF-GRADES DUE		
	HOMEWORK 10 DUE	Solutions PDF	
	HOMEWORK 10 SELF-GRADES RELEASED	Gradescope	
	HOMEWORK 11 RELEASED	Problems PDF - Problems Jupyter	

Week 12

Nov 8:	LECTURE 22	L1 Norms and LASSO - Recording	CEG Sec. 9.6.2, 13.4, 12.5
Nov 9:	DISCUSSION 11	Problems PDF - Solutions PDF	
Nov 10:	LECTURE 23	Advanced Descent Methods	CEG Sec. 12.5 BV Ch. 11 (first half)
Nov 11:	DISCUSSION 11	Cancelled: Campus Holiday	
	HOMEWORK 10 SELF-GRADES DUE		
	HOMEWORK 11 DUE	Solutions PDF - Solutions Jupyter	
	HOMEWORK 11 SELF-GRADES RELEASED	Gradescope	
	HOMEWORK 12 RELEASED	Problems PDF - Problems Jupyter	

Week 13

Nov 15: LECTURE 24 Applications: LQR/Control - [Recording](#)

Nov 16: DISCUSSION 12 [Problems PDF](#) - [Solutions PDF](#)

Nov 17: LECTURE 25 Applications: SVM - [Recording](#)

Nov 18: DISCUSSION 12 [Problems PDF](#) - [Solutions PDF](#)

HOMEWORK 11 SELF-GRADES DUE

HOMEWORK 12 DUE [Solutions PDF](#) - [Solutions Jupyter](#)

HOMEWORK 12 SELF-GRADES RELEASED [Gradescope](#)

HOMEWORK 13 RELEASED [Problems PDF](#)

Week 14

Nov 22: LECTURE 26 Applications: SVM - [Recording](#)

Week 15

Nov 29: LECTURE 27 Applications: Interior Point Methods - [Recording](#)

Nov 30: DISCUSSION 13 Not created (staff strike).

Dec 1: LECTURE 28 Applications: Policy Gradient - [Recording](#)

Dec 2: DISCUSSION 13 Not created (staff strike).

HOMEWORK 12 SELF-GRADES DUE

HOMEWORK 13 DUE [Solutions PDF](#) - [Solutions Jupyter](#)

RRR Week

Dec 8: FINAL PROJECTS DUE

Finals Week

Dec 16: FINAL EXAM [Problems PDF](#) - [Solutions PDF](#)