

Class #	Date	Main topics	Class topic	Suggested reading	Assignments	Tests, comments
1	8/17 Mon	Signals and systems	Introduction & review; CT & DT signals	OW 1.0–1.1		Recordings: class1a, class1b (Zoom; links on Moodle)
2	8/19 Wed		Power vs. energy signals; signal types overview	OW 1.2–1.3		Recording: class2 (Zoom; link on Moodle)
3	8/24 Mon		Exponential signals; introduction to impulse and step functions	OW 1.3–1.4		
4	8/26 Wed		DT step function; DT impulse function (delta)	OW 1.4		
5	8/31 Mon		CT step and delta functions; systems overview	OW 1.5		
6	9/2 Wed		System properties (cont'd): linearity, time-invariance, stability	OW 1.5–1.6	HW1 due Sep 4	
	9/7 Mon	Labor Day				No class
7	9/9 Wed		System properties (cont'd): time invariance, linearity; summary of system properties	OW 1.6	HW2 due Sep 11	
8	9/14 Mon	LTI systems	DT convolution: impulse response, convolution sum, key facts (identity, length, uniqueness); split-input and flip-and-slide examples	OW 2.1		Recordings: class 8a, class8b (Zoom; links on Moodle)
9	9/16 Wed		CT impulse response and convolution integral; convolution properties (commutative, associative, distributive); CT convolution examples	OW 2.2–2.3		Recordings: class 9a, class9b (Zoom; links on Moodle)
10	9/21 Mon		LTI system properties via impulse response: memoryless, invertible, causal, BIBO stable; DT step response	OW 2.3		
11	9/23 Wed	Linear algebra & ML	CT step response; ML overview; linear algebra review: vectors, inner products, matrices	OW 2.3; VT Ch5–6; Scheffe App. 1	HW3 due Sep 25	Slides ML. End of material for Test 1 (OW Ch. 1–2)
12	9/28 Mon		Linear algebra: inverses, convolution in matrix form, linear independence, vector spaces, basis, dimension/rank, projections, orthonormal bases	VT Ch5–6; Scheffe App. 1		
13	9/30 Wed		Orthogonal matrices; eigenvalues & eigenvectors; eigendecomposition of symmetric matrices (Matlab); PCA: maximizing variance	Scheffe App. 1; ISLR 10.2		Matlab code and yalefaces dataset posted for HW4
14	10/5 Mon		PCA (cont'd): derivation, KLT analysis/reconstruction, minimizing error, standardization, applications	ISLR 10.2; Murphy 12.2; Bishop 12.1		
	10/7 Wed		Test 1		HW4 due Oct 9 (PCA / eigenfaces & linear regression; Matlab)	In class, paper-based. Covers OW Ch. 1–2
15	10/12 Mon		Linear regression and prediction: least squares, normal equations, geometric interpretation, training vs. test error	Scheffe Ch1		

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16	10/14 Wed		Convolutional neural network (CNN): conv layers, ReLU, pooling, architectures (AlexNet, VGG, ResNet), softmax	DL Ch9		
	10/19 Mon	Fall Break				No class
17	10/21 Wed	Fourier analysis	CT Fourier series; complex exponentials as eigenfunctions of LTI systems	OW 3.2–3.4	HW5 due Oct 23	Slides CTFT
18	10/26 Mon		Fourier series (cont'd): properties; CT Fourier transform: definition, examples	OW 3.3–3.5, 3.7; 4.1		Recorded; no in-person class (links on Moodle)
19	10/28 Wed		CT Fourier transform (cont'd): FT of periodic signals, CT power and energy signals; CTFT properties & tables; sinc and rect	OW 4.2–4.3, 4.6		Recorded; no in-person class (links on Moodle)
20	11/2 Mon		Convolution and multiplication properties; filtering and modulation	OW 4.4–4.5, 4.7		
21	11/4 Wed	DT Fourier	DT Fourier series; DTFT and its properties	OW 3.6; 5.1–5.6	HW6 due Nov 6	Slides DTFT
22	11/9 Mon		DTFT (cont'd); DFT, FFT; relations among CTFT, DTFT, and DFT	OW 5.1–5.6		Slides DFT. End of material for Test 2
23	11/11 Wed	Sampling	Sampling theorem, Nyquist frequency, aliasing	OW 7.1–7.3		Not covered on Test 2
24	11/16 Mon	Laplace transform	Sampling theorem (cont'd); bilateral Laplace transform, pole-zero plots, ROC	OW 9.1–9.3		Slides Laplace. Not covered on Test 2
	11/18 Wed		Test 2		HW7 due Nov 20	In class, paper-based. Covers linear algebra & ML through the DFT (material through 11/9)
25	11/23 Mon		CT LTI system characterization; connections to frequency response	OW 9.4, 9.7–9.8		
	11/25 Wed	Thanksgiving break				No class
26	11/30 Mon	z-transform	Bilateral z-transform, pole-zero plots, ROC; DT LTI system characterization, connections to frequency response	OW 10.1–10.2, 10.4–10.5		
	12/7 Mon	Final Exam	Final exam			12:00–14:30, in class, paper-based. Comprehensive