

Date	Main topics	Class topic	Suggested reading	Assignments	Tests
1/8/2024	Introduction	Information is physical	1.1-1.3 in course notes		
1/10/2024		Toward quantum advantage	1.4, 1.5.1-1.5.2		
1/15/2024	MLK Day				
1/17/2024		LTI systems, sampling and reconstruction, Deutsch-Jozsa	Finish 1.5, 1.6-1.8		
1/22/2024	Math background	Complex numbers, geometric sequences, Taylor series	Ch2		
1/24/2024		Vectors, matrices	NC 2.1.1-2.1.3; 1.23.2023	HW1	
1/29/2024		Inner products, eigen-vectors	2.1.4-2.1.5; 1.25.2023		
1/31/2024		Hermitians, projections, unitaries, tensor products	2.1.6-2.1.7; 1.30.2023		
2/5/2024	DSP basics	Matrix operators, commutators, discrete time signals & systems	2.1.8-2.1.9; Proakis & Manolakis Ch1		
2/7/2024		Sampling and reconstruction, discrete time LTI systems	Ch2	HW2	Quiz1 math background
2/12/2024		Fourier transforms as inner product spaces	4.2 (slides p8)		
2/14/2024		Properties of Fourier, sinusoids as eigen-signals of LTI	4.2, 4.4, 5.1 (slides p32)	HW3	
2/19/2024		Filters, discrete Fourier transform (DFT)	5.4, 7.1 (slides p16)		
2/21/2024		Spectral estimation	7.4-7.5 (finished slides)	HW4	Quiz2 DSP
2/26/2024	Quantum basics	State spaces, quantum evolution, measurement	NC 2.2.1-2.2.3		
2/28/2024		Quantum measurement	NC 2.2.3, 2.2.5	HW5	
3/4/2024		Multi-qubit systems	2.2.8		Drop deadline
3/6/2024		EPR/Bell pairs and CHSH game	2.6	HW6	Quiz3 quantum
3/11/2024	Spring break				
3/13/2024	Spring break				
3/18/2024		Quantum teleportation and signs of quantum advantage	1.3.7,1.4		
3/20/2024	Hadamard transforms	Hadamard vs. Fourier transforms		HW7, Project proposal	
3/25/2024		Bernstein-Vazirani part 1			
3/27/2024		Bernstein-Vazirani part 2, Deutsch-Jozsa	NC 1.4	HW8	
4/1/2024		Simon's problem			
4/3/2024	Quantum Fourier transform	Classical DFT and fast Fourier transform (FFT)		HW9	
4/8/2024		Quantum Fourier transform (QFT)	NC 5.1		
4/10/2024		Quantum phase estimation (QPE) - quantum circuit	NC 5.2		
4/15/2024		Analysis of QPE			
4/17/2024		Noisy QPE, order finding	NC 5.3	HW10	
4/22/2024	Project presentations	Presentations		Project reports due	
4/26/2024	Final	12-2:30, same room			