

Date	Main topics	Class topic	Suggested reading	Modules	Assignments	Tests
1/8/2024	Introduction	Why did this course come up?				
1/10/2024		What tools will we use? Quantum, signal processing				
1/15/2024	MLK Day					
1/17/2024	Math background	Complex numbers, geometric sequences, Taylor series				
1/22/2024		Vectors, matrices	Nielsen&Chuang 2.1.1-2.1.3			
1/24/2024		Inner products, eigen-vectors, Hermitian operators	2.1.4-2.1.5		HW1	
1/29/2024		Hermitian operators, tensor products	2.1.6-2.1.7			
1/31/2024		Matrix operators, commutators, discrete time signals & systems	2.1.8-2.1.9; Proakis & Manolakis Ch1			
2/5/2024	DSP basics	Sampling and reconstruction, discrete time LTI systems	Ch2			
2/7/2024		Fourier transforms as inner product spaces	4.2		HW2	Quiz1 math background
2/12/2024		Properties of Fourier	4.2, 4.4			
2/14/2024		Sinusoids as eigen-functions of LTI systems, filters	5.1, 5.4		HW3	
2/19/2024		Discrete Fourier transform (DFT)	7.1			
2/21/2024	Quantum basics	Spectral estimation, state spaces, quantum evolution	7.4-7.5, NC 2.2.1-2.2.2		HW4	Quiz2 DSP
2/26/2024		Quantum measurement	NC 2.2.3, 2.2.5			
2/28/2024		Multi-qubit systems	2.2.8		HW5	
3/4/2024		EPR/Bell pairs and CHSH game	2.6			Drop deadline
3/6/2024		Quantum teleportation and signs of quantum advantage	1.3.7,1.4		HW6	Quiz3 quantum
3/11/2024	Spring break					
3/13/2024	Spring break					
3/18/2024	Hadamard transforms	Hadamard vs. Fourier transforms				
3/20/2024		Bernstein-Vazirani part 1			HW7, Project proposal	
3/25/2024		Bernstein-Vazirani part 2, Deutsch-Jozsa	NC 1.4			
3/27/2024		Simon's problem			HW8	
4/1/2024	Quantum Fourier transform	Classical DFT and fast Fourier transform (FFT)				
4/3/2024		Quantum Fourier transform (QFT)	NC 5.1		HW9	
4/8/2024		Quantum phase estimation (QPE) - quantum circuit	NC 5.2			
4/10/2024		Analysis of QPE				
4/15/2024		Noisy QPE, order finding	NC 5.3			
4/17/2024	Spare				HW10	
4/22/2024	Project presentations	Presentations			Project reports due	
4/26/2024	Final	12-2:30, same room				