

Date	Main topics	Class topic	Suggested reading	Modules	Assignments	Tests
1/9/2023	Introduction	Why did this course come up?				
1/11/2023		What tools will we use? Quantum, signal processing				
1/16/2023	MLK Day					
1/18/2023	Mathematical review	Complex numbers, Taylor series				
1/23/2023		Vectors, matrices	Nielsen&Chuang 2.1.1-2.1.3			
1/25/2023		Inner products, eigen-vectors, Hermitian operators, tensor product	2.1.4-2.1.5		HW1	
1/30/2023		Hermitian operators, tensor products	2.1.6-2.1.7			
2/1/2023		Matrix operators, commutators, discrete time signals & systems	2.1.8-2.1.9; Proakis & Manolakis Ch1			
2/6/2023	DSP basics	Sampling and reconstruction, discrete time LTI systems	Ch2			
2/8/2023		Fourier transforms as inner product spaces	4.2		HW2	
2/13/2023		Properties of Fourier	4.2, 4.4			
2/15/2023		Sinusoids as eigen-functions of LTI systems, filters	5.1, 5.4			
2/20/2023		Discrete Fourier transform (DFT)	7.1			Quiz1
2/22/2023	Quantum basics	Spectral estimation, state spaces, quantum evolution	7.4-7.5, NC 2.2.1-2.2.2		HW3	
2/27/2023		Quantum measurement	NC 2.2.3, 2.2.5			
3/1/2023		Multi-qubit systems	2.2.8			
3/6/2023		EPR/Bell pairs and CHSH game	2.6			Quiz2, Drop deadline
3/8/2023		Quantum teleportation and signs of quantum advantage	1.3.7,1.4		HW4	
3/13/2023	Spring break					
3/15/2023	Spring break					
3/20/2023	Hadamard transforms	Hadamard vs. Fourier transforms				
3/22/2023		Bernstein-Vazirani part 1			Project proposal	
3/27/2023		Bernstein-Vazirani part 2, Deutsch-Jozsa	NC 1.4			
3/29/2023		Simon's problem			HW5	
4/3/2023	Quantum Fourier transform	Classical DFT and fast Fourier transform (FFT)				
4/5/2023		Quantum Fourier transform (QFT)	NC 5.1			
4/10/2023		Quantum phase estimation (QPE) - quantum circuit	NC 5.2			
4/12/2023		Analysis of QPE				
4/17/2023		Noisy QPE, order finding	NC 5.3			
4/19/2023	Project presentations	Presentations			HW6	
4/24/2023		Presentations			Final project stuff	
5/1/2023	Final	12-2:30, same room				