

Date	Main topics	Class topic	Suggested reading	Slides	Assignments	Tests & comments
1/12/2026	Introduction	Information is physical (quantum basics, Deutsch's algo)	1.1-1.4 in course notes	intro pp1-25		"Information is physical"
1/14/2026		Toward quantum advantage (SP interlude, Deutsch-Jozsa)	1.5-1.6	intro pp26-57		Toward quantum advantage
1/19/2026	MLK Day					
1/21/2026	Math background	QFT, Complex numbers, geometric sequences, Taylor series	Finish Ch1, Ch2.1-2.2	intro 58-67, math pp1-21	HW1 intro	$\exp(i\pi)+1=0$
1/26/2026	Winter weather	Vectors, matrices	Finish Ch2, NC 2.1.1-2; Notes2	math pp22-46		Zoom recording
1/28/2026		Inner products	Nielsen&Chuang (NC) 2.1.1-2.1.3; Notes3	math pp47-63	HW2 math basics	
2/2/2026	Winter weather					
2/4/2026		Outer products, eigen-vectors	2.1.4-2.1.6; Notes4	math pp63-74		"Let's hope for less disruptive weather"
2/9/2026		Hermitian operators, projections; unitaries	2.1.6-2.1.8; Notes5	math pp75-94		
2/11/2026		tensor products, positive ops., matrix operators	2.1.8; Proakis&Manolakis Ch1; Notes6	math end	HW3 linear algebra	From digital to analog and back
2/16/2026	DSP basics	Intro to DSP	Proakis & Manolakis Ch1; Notes6	SP1_2 pp1-16	HW4 more algebra	Quiz1 math background + Feb 17 wellness day
2/18/2026		Sampling and reconstruction, discrete time LTI systems, Fourier tra	Ch2; Notes7; 4.2; Notes8	SP1_2 pp17-42, SP4_5 pp1-4		
2/23/2026		Properties of Fourier, sinusoids as eigen-signals of LTI	4.2, 4.4, 5.1; Notes9	SP4_5 pp5-27		"N numbers is all you need."
2/25/2026		Filters, discrete Fourier transform (DFT), spectral estimation	5.4, 7.1 (slides p16), 7.4-7.5; Notes10	SP4_5 pp28-43, SP7_8 pp1-18		
3/2/2026	Quantum basics	FFT, State spaces, quantum evolution	8, NC 2.2.1-2.2.2; Notes11	SP7_8 pp17-25	HW5 signal processing	
3/4/2026		Quantum measurement	NC 2.2.2-3; Notes12		HW6 spectral estimation	Quiz2 DSP
3/9/2026		Observables	NC 2.2.5; Notes12			
3/11/2026		Multi-qubit systems, EPR/Bell pairs	NC 2.2.4,2.2.5,2.2.7,2.2.8; Notes13		HW7 quantum gates	
3/16/2026	Spring break					
3/18/2026	Spring break					
3/23/2026		CNOT operation, generating Bell pairs	1.3.6, 2.6		Project proposal	"Spookier action at a distance"
3/25/2026		CHSH game, teleportation	2.6, 1.3.7; Notes14		HW8 multi qubit gates	Drop deadline
3/30/2026	Hadamard transforms	Signs of quantum advantage, Hadamard transform	NC 1.4; Notes15			Toward quantum advantage
4/1/2026		Hadamard properties, Bernstein-Vazirani motivation	Notes16		HW9 Deutsch-Jozsa	Quiz3 quantum
4/6/2026		Bernstein-Vazirani analysis, Deutsch-Jozsa	Notes17			"Rotate compute rotate"
4/8/2026		Simon's problem, complexity classes	Notes18		HW10 Bernstein-Vazirani	
4/13/2026	Grover, Fourier algorithms	Grover search, classical DFT and FFT	NC 6.1.1			
4/15/2026		QFT	NC 5.1; Notes19		HW11 Grover search	
4/20/2026		Quantum phase estimation (QPE)	NC 5.1-5.2; Notes20			
4/22/2026		QPE analysis, order finding	NC 5.2; Notes21		HW12 FFT & QPE	
4/27/2026		Presentations	NC 5.3		Project reports due	
5/4/2026	Final exam	12-2:30, same room				