

## C2QA Foundations of Quantum Information Science (QIS101) - Syllabus

### Week #1

MON	06/12/23	10:00 AM	11:00 PM	Session 01 - Introducing Quantum Computing
		11:00 AM	11:30 AM	Welcome - Andrew Houck, Director C2QA
		1:00 PM	3:00 PM	Session 01 - Introducing Quantum Computing
		4:00 PM	6:00 PM	Session 02 - Installing Courseware
TUE	06/13/23	10:00 AM	12:00 PM	Session 03 - Introducing Python
		1:00 PM	3:00 PM	Session 03 - Introducing Python
		4:00 PM	6:00 PM	TA Time
WED	06/14/23	10:00 AM	12:00 PM	Session 04 - Experimental Mathematics
		1:00 PM	3:00 PM	Session 04 - Experimental Mathematics
		4:00 PM	6:00 PM	Session 04 - Experimental Mathematics
THU	06/15/23	10:00 AM	12:00 PM	Session 05 - Algorithmic Efficiency
		1:00 PM	3:00 PM	Session 05 - Algorithmic Efficiency
		4:00 PM	6:00 PM	Session 06 - Data Visualization
FRI	06/16/23	10:00 AM	12:00 PM	Session 06 - Data Visualization
		1:00 PM	3:00 PM	Guest Lecturer - Michael Hatridge, U of Penn
		4:00 PM	6:00 PM	Session 06 - Data Visualization

### Week #2

MON	06/19/23	No Classes		Juneteenth Federal Holiday
TUE	06/20/23	10:00 AM	12:00 PM	Session 07 - Information Theory
		1:00 PM	3:00 PM	Session 07 - Information Theory
		4:00 PM	6:00 PM	Session 08 - Early Quantum Mechanics
WED	06/21/23	10:00 AM	12:00 PM	Session 08 - Early Quantum Mechanics
		1:00 PM	3:00 PM	Guest Lecturer - Carlos Ortiz Marrero, PNNL
		4:00 PM	6:00 PM	TA Time
THU	06/22/23	10:00 AM	12:00 PM	Session 09 - Probability and Statistics
		1:00 PM	3:00 PM	Session 09 - Probability and Statistics
		4:00 PM	6:00 PM	Session 10 - Numerical Analysis
FRI	06/23/23	10:00 AM	12:00 PM	Session 10 - Numerical Analysis
		1:00 PM	3:00 PM	Session 10 - Numerical Analysis
		4:00 PM	6:00 PM	TA Time

**Week #3**

MON	06/26/23	10:00 AM	12:00 PM	Session 11 - Complex Algebra
		1:00 PM	3:00 PM	Session 11 - Complex Algebra
		4:00 PM	6:00 PM	Session 11 - Complex Algebra

TUE	06/27/23	10:00 AM	12:00 PM	TA Time
		3:00 PM	4:00 PM	Virtual Tour - Center for Functional Nanomaterials

WED	06/28/23	10:00 AM	12:00 PM	Session 12 - Classical Wave Equations
		1:00 PM	3:00 PM	Session 12 - Classical Wave Equations
		4:00 PM	6:00 PM	Session 13 - Fourier Analysis

THU	06/29/23	10:00 AM	12:00 PM	Session 13 - Fourier Analysis
		1:00 PM	3:00 PM	Session 13 - Fourier Analysis
		4:00 PM	6:00 PM	Session 13 - Fourier Analysis

FRI	06/30/23	10:00 AM	12:00 PM	Session 14 - Linear Algebra
		1:00 PM	3:00 PM	Session 14 - Linear Algebra
		4:00 PM	6:00 PM	TA Time

**Week #4**

MON	07/03/23	No Classes		BNL Holiday
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TUE	07/04/23	No Classes		July 4th Holiday
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WED	07/05/23	10:00 AM	12:00 PM	Session 14 - Linear Algebra
		1:00 PM	3:00 PM	Guest Lecturer - Samuel Stein, PNNL
		4:00 PM	6:00 PM	Session 14 - Linear Algebra

THU	07/06/23	10:00 AM	12:00 PM	Session 15 - Vector Algebra
		1:00 PM	3:00 PM	Virtual Tour - National Light Source II
		4:00 PM	6:00 PM	Session 16 - Scientific Computing

FRI	07/07/23	10:00 AM	12:00 PM	Session 16 - Scientific Computing
		1:00 PM	3:00 PM	Session 16 - Scientific Computing
		4:00 PM	6:00 PM	TA Time

**Week #5**

MON	07/10/23	10:00 AM	12:00 PM	Session 17 - Simulation and Modelling
		1:00 PM	3:00 PM	Session 17 - Simulation and Modelling
		4:00 PM	6:00 PM	Session 18 - Differential Equations
TUE	07/11/23	10:00 AM	12:00 PM	Session 18 - Differential Equations
		1:00 PM	3:00 PM	Session 19 - Dynamical Systems
		4:00 PM	6:00 PM	Session 19 - Dynamical Systems
WED	07/12/23	10:00 AM	12:00 PM	Session 20 - Monte Carlo Methods
		1:00 PM	3:00 PM	<b>Guest Lecturer - Nick Brunn, IBM</b>
		4:00 PM	6:00 PM	Session 20 - Monte Carlo Methods
THU	07/13/23	10:00 AM	12:00 PM	Session 21 - Digital Circuits
		1:00 PM	3:00 PM	<b>Virtual Tour - QIST Lab</b>
		4:00 PM	6:00 PM	Session 21 - Digital Circuits
FRI	07/14/23	10:00 AM	12:00 PM	Session 22 - Quantum Mechanics
		1:00 PM	3:00 PM	Session 22 - Quantum Mechanics
		4:00 PM	6:00 PM	TA Time

**Week #6**

MON	07/17/23	10:00 AM	12:00 PM	Session 22 - Quantum Mechanics
		1:00 PM	3:00 PM	Session 22 - Quantum Mechanics
		4:00 PM	6:00 PM	Session 23 - Quantum Circuits
TUE	07/18/23	10:00 AM	12:00 PM	TA Time
		1:00 PM	3:00 PM	Session 23 - Quantum Circuits
		4:00 PM	6:00 PM	Session 23 - Quantum Circuits
WED	07/19/23	10:00 AM	12:00 PM	Session 23 - Quantum Circuits
		1:00 PM	3:00 PM	<b>Guest Lecturer - Layla Hormozi, BNL</b>
		4:00 PM	6:00 PM	Session 24 - Quantum Algorithms
THU	07/20/23	10:00 AM	12:00 PM	Session 24 - Quantum Algorithms
		1:00 PM	3:00 PM	<b>Virtual Tour - Physics (Collider-Accelerator)</b>
		4:00 PM	6:00 PM	TA Time
FRI	07/21/23	10:00 AM	12:00 PM	Session 24 - Quantum Algorithms
		1:00 PM	3:00 PM	Session 24 - Quantum Algorithms
		4:00 PM	6:00 PM	<b>Closing Ceremony - Kai Mei Fu, Deputy Dir C2QA</b>