Bachelor of Science in Data Science – Quantum Computing Concentration

Quantum computing, a new paradigm for computing that depends upon the quantum properties of reality, holds great promise for applications to data science including cryptography, deep learning, and simulation. Fundamental physics courses provide a discipline- specific foundation for quantum theory. Core concentration courses prepare students to understand and work with quantum computing, an inherently statistical approach to computational problem solving. Students who complete the concentration will possess not only a firm foundation in classical computing from the Data Science program as a whole, but will be ready to engage quantum computing as the next generation of enabling technologies for exciting applications such as AI.

Freshman Year

		Fall Semester					Spring Semester	
EN	1103	English Composition I	3	EN	1113	English Composition II	3
MA	1713	Calculus I	3	MA	1723	Calculus II	3
DSCI	2013	Data Science Literacy	3	PH	2213	Physics I	3
CSE	1284	Introduction to Programming	4	DSCI	2012	Lab - Data Wrangling	2
PH	1001	*Intro to Physics	1	CSE	1384	Intermediate Programming	4
Any		Social Science	3				

Sophomore Year

		Fall Semester					Spring Semester	
PHI	2223	Physics II (with lab)	3	DSCI	3012	Lab - Desc., Analysis, Inference	2
MA	2733	Calculus III	3	MA	3113	Intro to Linear Algebra	3
DSCI	3013	Fundamentals of Data Acquisition	3	CSE	2383	Data Structures and Analysis of Algorithms	3
MA/ST	3123	Statistical Inference	**3**	PH	3613	Modern Physics	3
CSE	2813	Discrete Structures	3	PHI	1113	Intro to Logic	3
				Any		Fine Arts	3

Junior Year

		Fall Semester					Spring Semester	
DSCI	3032	Lab - Artificial Intelligence	2	CSE	3763	Legal & Ethical Issues Computing	3
CSE	4633	Artificial Intelligence	3	PH	4163	Foundations of Quantum Computing	3
DSCI	4013	Data Visualization	3	BIS	3233	Management Information Systems	3
PH	2233	Physics III (with lab)	3	MA/ST	4523	Intro to Probability	3
CO	1003	Fundamentals of Public Speaking	3	EN	3313	Writing in the Workplace	3
DSCI	3022	Lab - Data Visualization	2				

Senior Year

		Fall Semester					Spring Semester	
DSCI	2022	Lab - Cloud, Quantum, HPC	2	MA	3253	Differential Equations I	3
PH	4413	**Thermal Physics	3	PH	4713	Intro to Quantum Principles	3
MA/ST	2743	Calculus IV	3	PH	4813	**Solid State Physics	3
CSE	4503	Database Management Systems	3	Any		Humanities	3
DSCI	4553	Capstone 1	3	DSCI	4663	Capstone 2	3

Revised 3.23.26

**Pathway 1: Required Courses
    PH 4152   Modern Physics Lab
    PH 4143   Intermed Laboratory

**Pathway 2: Choose 2 courses from the following list:

PH 3063	Astrophysics		PH 4113	Electric Circuit Science
PH 4413	Thermal Physics		PH 4433	Computational Physics
PH 4813	Solid State Physics		PH 4513	Optics
PH 4323	Electromag Fields I		PH 4613	Nuclear Particle Physics
PH 4213	Intermediate Mechanics I		PH 4723	App of Quantum Mech
PH 1063	Descriptive Astronomy		PH 4990	Special Topics