
Quantum
Computing
Academy

Quantum Computing Academy

Educational Program

Module 0: Introduction to Python
- Introduction to Classical Computing
- Boolean Algebra, Logic Circuits and Von Neumann Architecture
- Basic Concepts in Python
- Object-Oriented Programming and Modules

Module 1: Introduction to Quantum Computing with Qiskit
- Complex Numbers and Complex Vector Spaces
- From Probabilistic Systems to Quantum Systems
- Basics of Quantum Mechanics
- Qubits and Quantum Gates
- Quantum Programming with Qiskit

Module 2: Classical and Quantum Algorithms
- Introduction to Classical Algorithms and Complexity
- Quantum Algorithms: Deutsch, Deutsch-Jozsa, Grover, Simon, Shor

Module 3: Quantum Algorithms for Applications
- Classification Problems and Variational Quantum Classifiers
- Optimization Problems and Evolutionary Computation
- Quantum Genetic Operators
- Hybrid Quantum-Classical Algorithms
- Fuzzy Logic and Quantum Fuzzy Controllers

Module 4: Prompt Engineering
- Quantum Computing for Deep Learning and LLMs
- Prompts in Language Models
- Techniques for Designing Effective Prompts
- Context Management in Prompts
- Analysis and Optimization of Prompts
- Empirical Testing and Collection of User Feedback on Prompts

Module 5: Seminars on Quantum Technologies
- Quantum Hardware
- Quantum Error Mitigation
- Quantum Communications and Cryptography

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Course Schedule

November 2024			
Lesson 1	25 / 11 / 24	9:00 am – 6:00 pm	Module 0
Lesson 2	26 / 11 / 24	9:00 am – 6:00 pm	Module 0
Lesson 3	27 / 11 / 24	9:00 am – 6:00 pm	Module 0

December 2024			
Lesson 4	09 / 12 / 24	9:00 am – 6:00 pm	Module 0
Lesson 5	10 / 12 / 24	9:00 am – 6:00 pm	Module 1
Lesson 6	16 / 12 / 24	9:00 am – 6:00 pm	Module 1
Lesson 7	17 / 12 / 24	9:00 am – 6:00 pm	Module 1

January 2025			
Lesson 8	07 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 9	08 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 10	13 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 11	14 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 12	20 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 13	21 / 01 / 25	9:00 am – 6:00 pm	Module 1
Lesson 14	27 / 01 / 25	9:00 am – 6:00 pm	Module 2
Lesson 15	28 / 01 / 25	9:00 am – 6:00 pm	Module 2

February 2025			
Lesson 16	03 / 02 / 25	9:00 am – 6:00 pm	Module 2
Lesson 17	04 / 02 / 25	9:00 am – 6:00 pm	Module 3
Lesson 18	10 / 02 / 25	9:00 am – 6:00 pm	Module 3
Lesson 19	11 / 02 / 25	9:00 am – 6:00 pm	Module 3
Lesson 20	17 / 02 / 25	9:00 am – 6:00 pm	Module 3
Lesson 21	18 / 02 / 25	9:00 am – 6:00 pm	Module 3
Lesson 22	24 / 02 / 25	9:00 am – 6:00 pm	Module 4
Lesson 23	25 / 02 / 25	9:00 am – 6:00 pm	Module 4

March – April 2025			
Lesson 24	03 / 03 / 25	9:00 am – 6:00 pm	Module 4
Lesson 25	04 / 03 / 25	9:00 am – 6:00 pm	Module 5
Lesson 26	10 / 03 / 25	9:00 am – 6:00 pm	Module 5
Lesson 27	11 / 03 / 25	9:00 am – 6:00 pm	Module 5
Project Works (to be scheduled)			