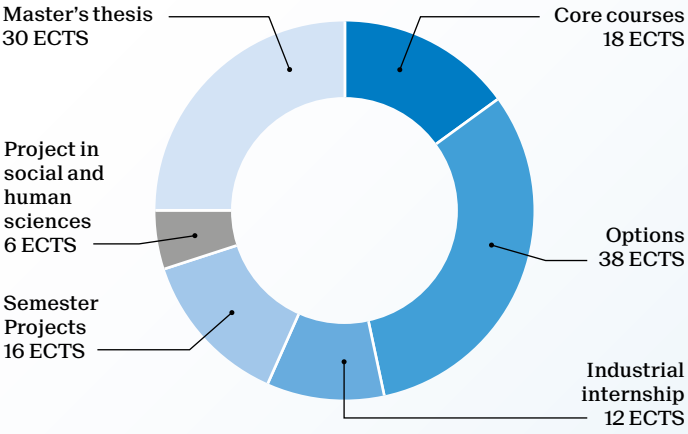
Master of Science in

QUANTUM SCIENCE AND ENGINEERING

2-year program - 120 ECTS



Students choose their option classes within one specialization:
A. Quantum information and computation
B. Quantum hardware and engineering

It is possible to take up to 8 credits within the other specialization or outside this study plan (upon validation by the program's committee).

Career prospects

Given the wide range of topics covered by this Master's program, graduates acquire a comprehensive set of skills enabling them to become the main actors of the next "quantum revolution" as many companies are increasingly embracing quantum information technology, both at the level of research and development, and within a proactive implementation strategy at the level of advanced services. Besides pursuing careers in quantum science, their interdisciplinary profile also enables graduates to thrive in the information technology sector and in the industry at large.

Schools of Basic Sciences,
Engineering, Computer and Communication Sciences
go.epfl.ch/master-quantum-science
Contact: siq@epfl.ch

			Credits
Core courses			**18**
Computational complexity			6
Fundamentals of solid-state materials			4
Introduction to quantum computation			5
Introduction to quantum information processing			5
Introduction to quantum science and technology			5
Quantum and nanocomputing			6
Quantum physics I			5
Semiconductor devices I			4
Solid state systems for quantum information			4

Options			**38**
Advanced cryptography	A		6
Advanced machine learning		B	4
Algorithms II	A		8
Artificial neural networks/reinforcement learning	A		6
Atomistic and quantum simulations of materials		B	4
Classical and quantum photonic transducers		B	3
Computational methods in molecular quantum mechanics	A	B	4
Computational quantum physics	A		4
Cryptography and security	A		8
Deep learning		B	4
Distributed algorithms	A		8
Foundations of data science	A	B	8
Fundamentals of integrated photonic components		B	4
Information theory and coding	A		8
Interacting Quantum Matter	A		4
Introduction to crystal growth by epitaxy		B	2
Introduction to electronic structure methods	A	B	4
Lab in nanoelectronics		B	4
Low rank approximation techniques	A		5
Machine learning	A	B	8
Machine learning for physicists	A		4
Mathematics of data: from theory to computation		B	6
Metrology		B	3
Metrology praticals		B	2
Molecular dynamics and monte carlo simulations	A	B	2
Molecular quantum dynamics	A	B	3
Nanoelectronics		B	2
Nanotechnology		B	3
Nonlinear optics for quantum technologies	A	B	4
Optimization for machine learning	A		8
Photonic systems and technology		B	4
Physics of photonic semiconductor devices	A	B	4
Physique quantique II	A	B	5
Properties of semiconductors and related nanostructures		B	5
Quantum electrodynamics and quantum optics	A	B	6
Quantum information and quantum computing	A	B	4
Quantum information theory	A	B	4
Quantum optics and quantum information	A	B	6
Quantum transport in mesoscopic systems	A	B	4
Semiconductor devices II		B	4
Semiconductor physics and light-matter interaction	A	B	4
Solid state physics III	A		6
Statistical mechanics	A	B	4
Statistical physics IV	A	B	6