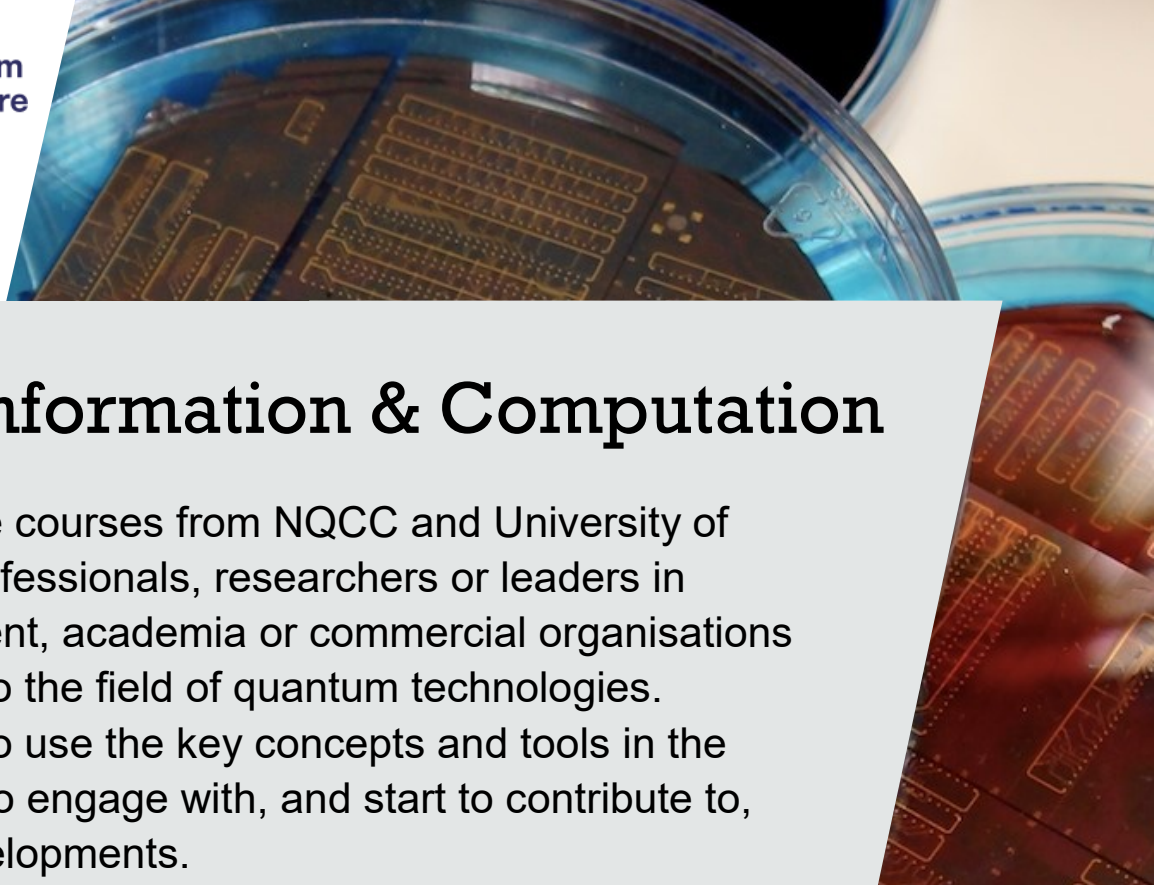




National Quantum
Computing Centre



University of
BRISTOL



Quantum Information & Computation

Two six-week online courses from NQCC and University of Bristol, aimed at professionals, researchers or leaders in business, government, academia or commercial organisations wanting to move into the field of quantum technologies.

Learn and be able to use the key concepts and tools in the field to enable you to engage with, and start to contribute to, state-of-the-art developments.

Quantum Information

A self-contained professional-level introduction to quantum information theory, accessible to anyone with a background in mathematics, physics, computer science or engineering.

By the end of this course you will be able to understand the concepts and mathematical techniques needed for quantum mechanics and information theory. You will also learn about quantum teleportation, superdense coding, quantum key distribution and quantum non-locality.

Quantum Computation

This course builds upon Quantum Information to describe the concepts underpinning quantum computation.

By the end of this course you will understand the key algorithms and their applications, such as Shor's and Grover's algorithms and quantum simulation. You will also learn about the quantum Fourier transform and phase estimation, quantum error correction and noise and quantum channels.

Online courses delivered by world-leading experts
Professor Noah Linden and Dr Paul Skrzypczyk

Quantum Information course dates: 16th May — 8th July 2022

Content: 18 hours recorded material and supporting notes

Time commitment: Two weekly one-hour live interactive sessions.
One assignment per week. Total time commitment of 50-60 hours

Duration: Six weeks (with one-week break w/c 13th June 2022)

Above information is per course

Contact us: quantum-courses@bristol.ac.uk

Register interest: bris.ac.uk/maths/nqcc-bristol-course

Introductory Offer

One course

£3,000

Normal price £5,000

Two courses

£5,000

Normal price £8,000

Quantum Information

Delivered by Prof Noah Linden &
Dr Paul Skrzypczyk

- Mathematical tools for quantum mechanics (inc. Dirac notation)
- The rules of quantum mechanics
- Multi-party quantum systems
- Key quantum information primitives: no-cloning, super-dense coding, teleportation
- Introduction to quantum computing: Deutsch's and the Deutsch-Jozsa algorithm
- Quantum cryptography
- Density operators and reduced density operators
- The Bloch sphere
- Bell's theorem and quantum nonlocality

One course

£3,000

Normal price £5,000

Two courses

£5,000

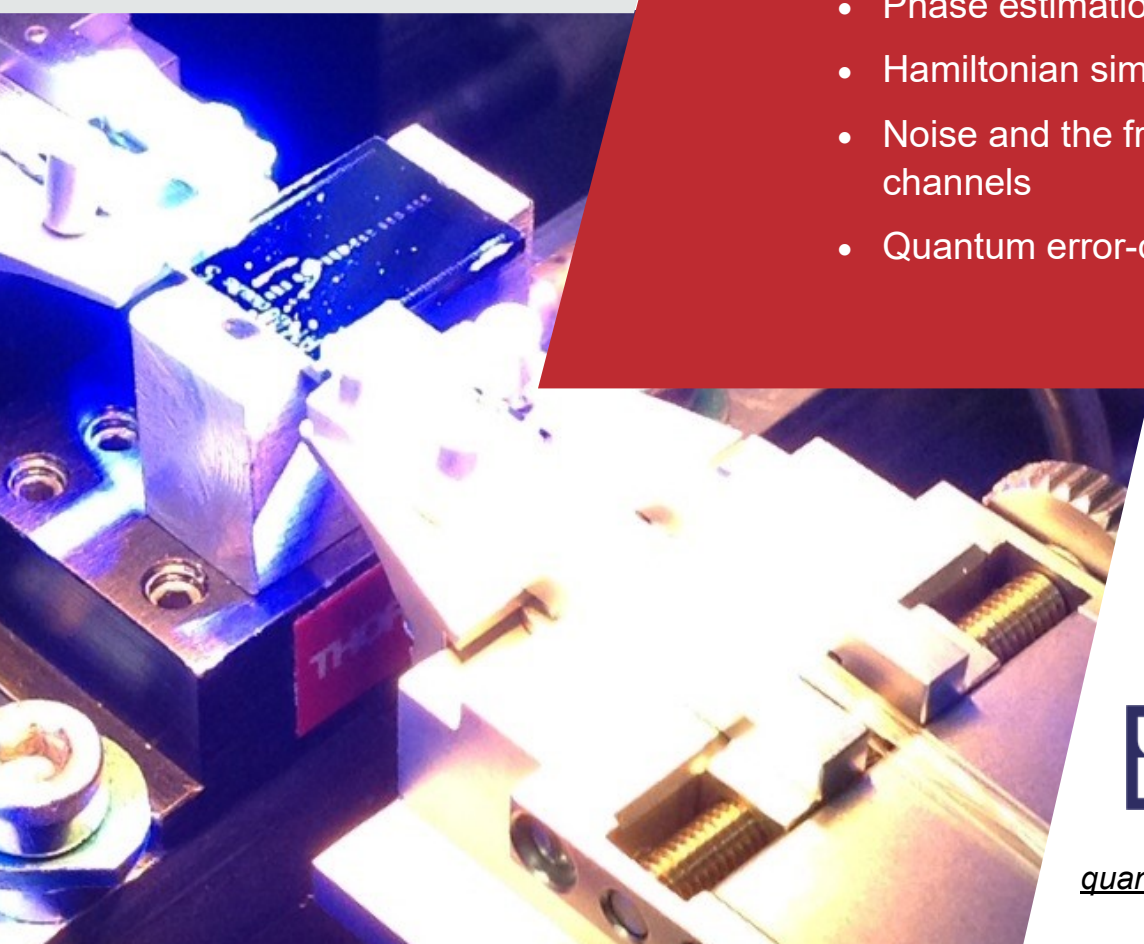
Normal price £8,000

bris.ac.uk/maths/nqcc-bristol-course

Quantum Computation

Delivered by Prof Noah Linden
& Dr Paul Skrzypczyk

- Classical and quantum computational complexity
- Grover's algorithm and its generalisations
- The quantum Fourier transform and periodicity
- Integer factorisation
- Phase estimation
- Hamiltonian simulation
- Noise and the framework of quantum channels
- Quantum error-correction



 University of
BRISTOL

 National Quantum
Computing Centre

quantum-courses@bristol.ac.uk