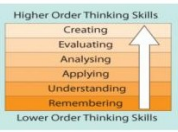




The Training Company



# The Training Company

## Quantum Computing

### Course outline

#### I. Introduction to quantum mechanics

- Hilbert space
- Unitary and stochastic dynamics
- Probabilities and measurements
- Entanglement
- Density operators and correlations

#### II. Introduction to quantum information

- Classical information theory
- Quantum information types and quantum channels
- Dense coding
- Teleportation
- No cloning
- Quantum cryptography

#### III. Quantum algorithms

- Classical computation
- Shor factorization
- Grover search
- Measurement-based computation

#### IV. Physical realizations

- Optical lattices

## V. Noise and error correction

- Quantum operations
- Graph states and codes
- Quantum error correction
- Fault-tolerant computation

### **PREREQUISITES:**

Students should be familiar with linear algebra of complex vector spaces, or prepared to rapidly learn it on their own. Chapter 3 of Griffiths, *Consistent Quantum Theory*, contains the essentials.

Quantum theory is not a prerequisite, and appropriate quantum concepts will be introduced as needed. Some prior knowledge will prove helpful.

Algorithms and complexity theory are not prerequisites, and the appropriate concepts will be introduced as needed. Some prior knowledge of these topics will prove helpful.

**Course duration** : 10 Days.

For registration

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