There are approximately 24 lectures. The timing information below is approximate.


2. **Quantum algorithms and complexity theory** (8 lectures).

3. **Density matrices and quantum operations on them** (3 lectures).

4. **Distance measures between quantum states** (1 lecture).
   - Fidelity and trace distance. Holevo-Helstrom theorem.

5. **Entropy and noiseless coding** (1 lecture).
   - Overview of classical entropy and noiseless compression. Quantum entropy. Schumacher’s compression.

6. **Error-correcting codes and fault-tolerance** (3 lectures).

7. **Nonlocality** (2 lectures).
   - Examples of Bell inequality violations, such GHZ and CHSH. (Optional: quantum protocol for equality testing in the simultaneous message model using fingerprint states and the swap test.)

8. **Cryptography** (3 lectures).
   - Brief overview of classical cryptography: one-time pad and complexity-based cryptosystems. BB84 protocol: how it works, and heuristic discussion of its security. Some formal analysis of security, such as BB84 with single qubit measurements or Lo-Chau cryptosystems. Schmidt decomposition and its application to breaking proposed scheme for bit commitment.