Quantum Technologies MSc

The Quantum Technologies MSc will take students to the cutting-edge of research in the emerging area of quantum technologies, giving them not only an advanced training in the relevant physics but also the chance to acquire key skills in the engineering and information sciences.

**Degree summary**

Students learn the language and techniques of advanced quantum mechanics, quantum information and quantum computation, as well as state-of-the-art implementation with condensed matter and quantum optical systems.

UCL offers one of the leading research programmes in quantum technologies anywhere in the world, as well as outstanding taught programmes in the subjects contributing to the field (including physics, computer science, and engineering). It also hosts the EPSRC Centre for Doctoral Training in Delivering Quantum Technologies.

The programme provides a rigorous grounding across the disciplines underlying quantum technologies, as well as the chance to work with some of the world’s leading groups in research projects. The new Quantum Science and Technology Institute (‘UCLQ’) provides an umbrella where all those working in the field can meet and share ideas, including regular seminars, networking events and opportunities to interact with commercial and government partners.

The programme is delivered through a combination of lectures and seminars, with self-study on two modules devoted to the critical assessment of current research topics and the corresponding research skills. Assessment is through a combination of problem sheets, written examinations, case study reports and presentations, as well as the MSc project dissertation.

**Degree structure**

Mode: Full-time: 1 year; Part-time: 2 years; Flexible: up to 2 years
Location: London, Bloomsbury

One year programme which is also available part-time over two years. Students undertake modules to the value of 180 credits. The programme consists of three core modules (45 credits), three optional modules (45 credits) and a research project (90 credits).

Please note that the list of modules given here is indicative. This information is published a long time in advance of enrolment and module content and availability is subject to change.

**COMPULSORY MODULES**
- Atom and Photon Physics
- Advanced Quantum Theory
- Quantum Communication and Computation

**OPTIONAL MODULES**
- Advanced Photonic Devices
- Nanoelectronic Devices
- Nanoscale Processing for Advanced Devices
- Optical Transmission and Networks
- Order and Excitations in Condensed Matter
- Physics and Optics of Nano-Structures
- Research Computing with C++
- Research Software Engineering with Python

**RESEARCH PROJECT AND CASE STUDIES**
- The MSc programme culminates in the quantum technologies project and attached case studies. All students undertake two case studies related to quantum technologies as well as an independent research project (experimental or theoretical), which will be the subject of a presentation and a dissertation of 10,000-15,000 words. Research-active supervisors will provide topics which will enable the students to make contributions to research in the field.
Your career

The programme prepares graduates for careers in the emerging quantum technology industries which play an increasingly important role in: secure communication; sensing and metrology; the simulation of other quantum systems; and ultimately in general-purpose quantum computation. Graduates will also be well prepared for research at the highest level in the numerous groups now developing quantum technologies and for work in government laboratories.

Employability

Graduates will possess the skills needed to work in the emerging quantum industries as they develop in response to technological advances.
Entry requirements

A minimum of an upper second-class Bachelor's degree from a UK university or an overseas qualification of an equivalent standard in physics, engineering, mathematics, computer science or a related subject, with evidence of familiarity with basic quantum mechanics.

English language proficiency level

If your education has not been conducted in the English language, you will be expected to demonstrate evidence of an adequate level of English proficiency.

The level of English language proficiency for this programme is: Standard.

Information about the evidence required, acceptable qualifications and test providers is provided at: www.ucl.ac.uk/graduate/english-requirements

Your application

Students are advised to apply as early as possible due to competition for places. Those applying for scholarship funding (particularly overseas applicants) should take note of application deadlines.

When we access your application we would like to learn:

// why you want to study Quantum Technologies at graduate level
// why you want to study Quantum Technologies at UCL
// what particularly attracts you to the chosen programme
// how your academic and professional background meets the demands of this challenging programme
// where you would like to go professionally with your degree

Together with essential academic requirements, the personal statement is your opportunity to illustrate whether your reasons for applying to this programme match what the programme will deliver. Applicants who have a portfolio are strongly recommended to submit it when they apply.

There is an application processing fee for this programme of £75 for online applications and £100 for paper applications. Further information can be found at: www.ucl.ac.uk/prospective-students/graduate/taught/application.