Course Information Sheet for entry in 2026-27: DPhil in Superconductivity (EPSRC CDT)

Course facts

Mode of study	Full Time	Part Time
Expected length	4 years	6 to 8 years

About the course

This four-year course is part of the EPSRC Centre for Doctoral Training (CDT) on Superconductivity: Enabling Transformative Technologies and is designed to equip students with advanced skills to tackle the biggest challenges in superconductivity.

The aim of the Superconductivity CDT is to train you with the essential multidisciplinary skills required to support the growing UK superconductivity industry and develop the transformative technologies needed to engineer Net-Zero, improved healthcare, and quantum devices.

The CDT brings together graduate superconductivity training at the Universities of Bristol, Oxford and Cambridge across their Physics, Materials, Engineering and Chemistry departments.

The CDT has partnerships with several major companies which use superconducting technology as well as with international large-scale facilities. This new centre will form a nucleus for the entire UK superconductivity community, offering training and networking opportunities to those in the wider ecosystem.

The Superconductivity CDT will train a new generation of superconductivity scientists to make substantial contributions in the development of transformative technologies through six closely connected themes.

Course structure

During the first year (or first two years if studying part-time) you will take a series of eight well-structured, graduate-level lecture courses, which will lead you through the many aspects of superconductivity research from the fundamental theory, via the science of material design, to the application.

There will be a range of taught modules and you will choose eight lecture courses, comprising five lectures per course, and additional practical or computational courses that are most relevant to your degree progression. You are likely to spend around half your time doing research, with the remaining half dedicated to taught modules, partner placements, cohort and group activities.

After the first year you will focus mainly on your research project, although alongside this you will be involved in outreach activities, and participate in cohort activities focused on additional soft skills training to prepare you for your future career along with thesis writing.

The CDT training contains a partner placement or a mini project for up to six weeks which will be co-delivered with the CDT partners and could take place away from Oxford.

To learn more about the research topics you'll have the opportunity to explore, please refer to the *Research areas* section on this page.

Attendance

The course can be studied full-time or part-time with both modes requiring attendance in Oxford. Full-time students are subject to the University's Residence requirements. (//www.ox.ac.uk/admissions/graduate/after-you-apply/accommodation/residence-requirements) Part-time students are required to attend course-related activities in Oxford for a minimum of 30 days each year.

The full-time first year courses will be spread across the first two years of the part-time programme. The remainder (6 years) will be focused on the research component and writing up. There is flexibility in how the units will be divided up between the first two years depending on the individual circumstances and when the programme is started. The progression milestones will also be extended accordingly to account for the part-time arrangements.

In some cases, you will be assigned joint projects that will require you to be based away from Oxford for certain periods of time.

Similarly, some of the projects may require you to undertake a portion of your research outside of the University, which may require travel to and attendance at a site that is not located in Oxford. In such cases the CDT will provide support towards associated costs.

Provision exists for students on some courses to undertake their research in a ‘well-founded laboratory’ outside of the University. This may require travel to and attendance at a site that is not located in Oxford. Where known, existing collaborations will be outlined on this page. Please read the course information carefully, including the additional information about course fees and costs.

Resources to support your study

As a graduate student, you will have access to the University's wide range of resources including libraries, museums, galleries, digital resources and IT services.

The Bodleian Libraries is the largest library system in the UK. It includes the main Bodleian Library and libraries across Oxford, including major research libraries and faculty, department and institute libraries. Together, the Libraries hold more than 13 million printed items, provide access to e-journals, and contain outstanding special collections including rare books and manuscripts, classical papyri, maps, music, art and printed ephemera.

The University's IT Services is available to all students to support with core university IT systems and tools, as well as many other services and facilities. IT Services also offers a range of IT learning courses for students to support with learning and research, as well as guidance on what technology to bring with you as a new student (https://www.it.ox.ac.uk/what-to-bring) at Oxford.

Training will be provided by superconductivity experts in world leading departments, together offering a comprehensive range of facilities for superconductivity research.

There is a range of welfare and academic support available in the participating departments. Your supervisor, the Director of Graduate Studies, and Graduate Administrator are all available to offer support. There are also several support networks, all of which are available to our graduate students.

Supervision

For this course, the allocation of graduate supervision is the responsibility of the departments involved in the CDT (Departments of Physics, Materials and Chemistry) and it is not always possible to accommodate the preferences of incoming graduate students to work with a particular member of staff.

Students on the Superconductivity CDT will be supervised by a University member of staff who acts as the academic supervisor. In many cases, students could be co-supervised by another scientist from one of the participating departments, or depending on the project, from a industry partner, if the project requires a co-supervisor from outside the University (see course page on the department website for details). In all these cases, your main University supervisor will be responsible for your progress and for ensuring that the project is of suitable content and level to satisfy the normal expectations of a DPhil at the University.

The frequency of student-supervisor meetings varies depending on the nature of your project but you should expect to interact with your supervisors weekly or, in some cases, monthly. Most supervisors run an extended research group, including several DPhil students and post-docs, who interact very frequently (often on a daily basis).

Assessment

All students will be initially admitted to the status of Probationer Research Student (PRS).

If you are a full-time student, you will be expected to apply for the transfer of status from Probationer Research Student to DPhil status within a maximum of 4 terms as a PRS student (and normally after the third term).

Part-time students will be expected to apply for the transfer from PRS to DPhil within a maximum of 8 terms as a PRS student (and normally after the seventh term).

A successful transfer of status from PRS to DPhil status will require satisfactory attendance, the accumulation of the training credits and the submission of a report of up to 10,000 words. Students who are successful at transfer will also be expected to apply for and gain confirmation of DPhil status within 10 terms (for full-time) or 20 terms (for part-time) of admission, to show that their work continues to be on track.

Both milestones normally involve an interview with two assessors (other than your supervisor) and therefore provide important experience for the final oral examination. In exceptional circumstances students may transfer to an MSc by Research degree, which will be considered on a case-by-case basis.

To be successfully awarded a DPhil in your respective area you will need to defend your thesis orally (viva voce) in front of two appointed examiners.

Course components

Compulsory study

Practical Techniques

This unit will introduce many of the practical techniques used in superconductivity research. This will give you first hand experience in using these techniques so you can see how they are applied in practice, which will help you understand and critically appraise data from others in the literature. The modules will cover basic experimental techniques such as those needed to perform low noise electrical measurements, use of advanced instruments such as a SQUID magnetometer, x-ray diffractometer, electron and focussed ion beam microscopes and elemental analysis, sample synthesis and thin film device fabrication. There are also practical modules on numerical techniques and high-performance computing.

Group Project and Colloquia

This unit will introduce you to the most up-to-date scientific literature in the field of superconductivity. You will learn about which topics are currently at the forefront of research, how to critically evaluate papers and assimilate knowledge from different papers and perspectives and solve problems as a group. Presentation of materials will allow you to gain presentation skills.

Partner Placement Project

This unit will give you the opportunity to see applications of superconductivity research in a non-academic environment and give you experience of a different research field to your main DPhil topic. In most cases the project will be done away from the home institution, so that you will engage with the environment in an industrial or research facility setting.

Research Project

A research project is the central task of a DPhil programme of study. This unit will encompass the first year of work on this project, giving you the background knowledge and research skills you will need to succeed in your DPhil.

Options

Course Lectures

During the first year of full-time study (or first two years if studying part-time) you will be required to complete eight lecture courses, comprising up to six lectures per course, chosen out of a list of around 13 options. Completion of the eight lecture courses is compulsory.

Previous options have included:

- Fundamental Physics of Conventional Superconductivity. Electromagnetic and thermodynamic properties. BCS theory and strong coupling.
- Fundamental Physics of Unconventional Superconductivity. High temperature cuprates / iron based, heavy fermions, spin fluctuation pairing and alternatives.
- Materials design for large scale applications. Materials selection, manufacturing, control of microstructure in technological superconductors, joints, wires/tapes and bulks, key properties and future prospects for commercial products and engineering sectors.
- High field magnet applications of superconductors. Magnet design considerations including quench protection, cable design etc, magnets for fusion, MRI/NMR; accelerators / high energy Physics, high field research magnets, proton therapy.
- Energy, power, and transport applications of superconductors. AC loss, transmission cables, motors and generators for applications including wind turbines, electric aircraft, ship propulsion.
- Superconducting devices and sensors. SQUIDS and superconducting Qubits, single photon detectors, filters for communications, materials, fabrication.
- Electronic and thermal transport. Boltzmann theory and electronic transport in high magnetic fields, interpretation of experimental transport data including theoretical model.
- Strongly correlated metals. Fermi liquid theory, electron-phonon effects, non-Fermi liquid effects, quantum phase transitions.
- Introduction to many-body theory. Second Quantization, Greens functions, self-energy, linear response, Feynman diagrams, connection to Fermi liquid theory, Hubbard model.
- Materials modelling. Density functional theory, choice of functional, mixed methods (DMFT), tight binding, surfaces and defects, structure searches and machine learning, phonons.
- Material synthesis. Principles of materials design and crystal synthesis, bulk crystal growth from melt and solution
- Probes of matter. Determination of atomic and magnetic structure by diffraction of x-rays, neutrons and electrons, inelastic scattering, principles of scanning probe microscopy (STM, AFM, SEM), electronic structure determination using ARPES and quantum oscillations.
- Enabling technologies for superconducting applications. Cryogenics and cooling technologies, materials properties and design of cryogenic systems, vacuum technologies

Options may vary from year to year and there is no guarantee that the examples listed above will be offered in the future.

Research areas

You'll have the opportunity to undertake research within the specialised themes of this course, which include:

- Fundamentals of Superconductivity
- Modelling of Superconductors
- Physical Properties of Superconductors
- Synthesis and Processing of Superconductors
- Applications of Superconductors
- Superconducting Devices.

The CDT training contains a partner placement or a mini project for up to six weeks which will be co-delivered with the CDT partners and could take place away from Oxford.

After the first year you will focus mainly on your research project. You will be assigned your project and supervisor(s) at the beginning of the course.

Changes to this course

The University will seek to deliver this course in accordance with the description set out in this course page. However, there may be situations in which it is desirable or necessary for the University to make changes in course provision, either before or after registration. The safety of students, staff and visitors is paramount and major changes to delivery or services may have to be made if a pandemic, epidemic or local health emergency occurs. In addition, in certain circumstances, for example due to visa difficulties or because the health needs of students cannot be met, it may be necessary to make adjustments to course requirements for international study.

Where possible your academic supervisor will not change for the duration of your course. However, it may be necessary to assign a new academic supervisor during the course of study or before registration for reasons which might include illness, sabbatical leave, parental leave or change in employment.

For further information please see our page on changes to courses (//www.ox.ac.uk/admissions/graduate/courses/changes-to-courses) and the provisions of the student contract (//www.ox.ac.uk/admissions/graduate/after-you-apply/your-offer-and-contract) regarding changes to courses.

Costs

Annual course fees for the 2026-27 academic year at the University of Oxford

The fees for this course are charged on an annual basis.

Full-time study

Part-time study

What do course fees cover?

Course fees cover your teaching as well as other academic services and facilities provided to support your studies. Unless specified in the additional information section below, course fees do not cover your accommodation, residential costs or other living costs. They also don't cover any additional costs and charges that are outlined in the additional costs information below.

How long do I need to pay course fees?

Course fees are payable each year, for the duration of your fee liability (your fee liability is the length of time for which you are required to pay course fees). For courses lasting longer than one year fees will usually increase annually, as explained in the University's Terms and Conditions (//www.ox.ac.uk/students/new/contract) .

Graduate students who have reached the end of their standard period of fee liability will be required to pay a University continuation charge and/or a college continuation charge.

The University continuation charge, per term for entry in 2026-27 is £656, please be aware that this will increase annually. For part-time students, the termly charge will be half of the termly rate payable by full-time students.

If a college continuation charge applies (not applicable for non-matriculated courses) it will be between £150 and £500, as explained in our information about continuation charges (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges/continuation-charges) . Please contact your college for more details, including information about whether your college's continuation charge is applied at a different rate for part-time study.

Where can I find more information about fees?

Our fees and other charges (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges) pages provide further information, including details about:

- course fees and fee liability (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges/courses-fees-and-liability) ;
- how your fee status is determined (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges/fee-status) ;
- changes to fees and other charges (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges/changes-to-fees-and-charges) ; and
- continuation charges (//www.ox.ac.uk/admissions/graduate/fees-and-funding/fees-and-other-charges/continuation-charges) .

Information about how much fees and other costs will usually increase each academic year is set out in the University's Terms and Conditions (//www.ox.ac.uk/students/new/contract) .

Additional costs

Full-time study

Part-time study

Living costs

In addition to your course fees and any additional course-specific costs, you will need to ensure that you have adequate funds to support your living costs for the duration of your course.

Living costs for full-time study

For the 2026-27 academic year, the range of likely living costs for a single, full-time student is between £1,405 and £2,105 for each month spent in Oxford. We provide the cost per month so you can multiply up by the number of months you expect to live in Oxford. Depending on your circumstances, you may also need to budget for the costs of a student visa and immigration health surcharge (//www.ox.ac.uk/admissions/graduate/fees-and-funding/living-costs) and/or living costs for family members or other dependants (//www.ox.ac.uk/admissions/graduate/fees-and-funding/living-

costs#field_listing_content_content-item--2) that you plan to bring with you to Oxford (if dependant visa eligibility criteria (//www.ox.ac.uk/students/visa/before/family) are met).

Living costs for part-time study

Your living costs may vary depending on your personal circumstances but you will still need to cover your cost of living on a full-time basis for the duration of your course, even if you will not be based in Oxford throughout your studies. While the range of likely living costs for a single, full-time student living in Oxford in the 2026-27 academic year is between £1,405 and £2,105 per month, living costs outside Oxford may be different.

Part-time students who are not based in Oxford will need to calculate travel and accommodation costs carefully. Depending on your circumstances and study plans, this may include the cost of a visitor visa to attend for short blocks of time (//www.ox.ac.uk/admissions/graduate/fees-and-funding/living-costs) (if visitor visa eligibility criteria (//www.ox.ac.uk/students/visa/before/visitors) are met).

Further information about living costs

The current economic climate and periods of high national inflation in recent years make it harder to estimate potential changes to the cost of living over the next few years. For study in Oxford beyond the 2026-27 academic year, it is suggested that you budget for potential increases in living expenses of around 4% each year – although this rate may vary depending on the national economic situation.

A breakdown of likely living costs for one month during the 2026-27 academic year are shown below. These costs are based on a single, full-time graduate student, with no dependants, living in Oxford.

Likely living costs for one month in Oxford during the 2026-27 academic year

	Lower range	Upper range
Food	£315	£545
Accommodation	£825	£990
Personal items	£160	£310
Social activities	£50	£130
Study costs	£35	£90
Other	£20	£40
Total	£1,405	£2,105

For information about how these figures have been calculated as well as tables showing the likely living costs for nine and twelve months, please refer to the living costs (//www.ox.ac.uk/admissions/graduate/fees-and-funding/living-costs) page of our website.

Document accessibility

If you require a more accessible version of this document please contact Graduate Admissions and Recruitment by email (graduate.admissions@admin.ox.ac.uk).