# MSc Technology for Sustainable Cities with Advanced Practice

## London Campus

**Level of study:** Postgraduate

**Mode of study:** Full-time

**Duration:** 16-24 months

**Response to Covid-19:** Our focus is on providing a safe and welcoming learning environment and ensuring continued access to learning.

As a result of the coronavirus (Covid-19) pandemic and resulting social distancing requirements, we are intending to teach this course using a mix of on-campus and online learning activities. We continue to be guided by the Government to ensure our campus is Covid-secure. More information about our response to Covid-19 and FAQs are available here.

All information is accurate at the time of sharing. Courses starting in 2021 are offered as a mix of face to face and online learning. We continue to monitor government and local authority guidance in relation to Covid-19 and we are ready and able to flex accordingly to ensure the health and safety of our students and staff. Contact time is subject to increase or decrease in line with additional restrictions imposed by the government or the University in the interest of maintaining the health and safety and wellbeing of students, staff, and visitors, potentially to a full online offer, should further restrictions be deemed necessary in future. Our online activity will be delivered through Blackboard Ultra, enabling collaboration, connection and engagement with materials and people.

## Overview

The UN estimates that by 2050, 68% of the world s population will live in urban areas; an extra 2.5 billion people on today s number. This rapid urbanisation is occurring at a time of global targets for reduced emissions. Cities are also estimated to be responsible for 80% of CO2 emissions. The challenge for today s governments, urban planners, technical specialists and architects then, is how to support the sustainable development of our cities that reduce emissions and maximise efficiency whilst providing the basis for a culturally rich and exciting space to live.

Our MSc Technology in Sustainable Cities offers a multidisciplinary approach to planning sustainable urban solutions,

developing computing expertise with urban planning technologies to prepare students for exciting careers applying technologies to more sustainable urban living.

## Key facts

- Work in QGIS or a similar cross-platform to view, edit and analyse spatial data and will be introduced to C++ or Python to create plugins
- Develop a career plan and reflective log considering how your learning from the programme can accelerate the achievement of this plan
- Design an IoT solution for a sustainable smart city as part of your assessment
- The Advanced Practice includes an Internship or Group Consultancy Project, enhancing your employability with all-important work experience
- This programme has been designed to meet the accreditation criteria of BCS, the Chartered Institute for IT for the purposes of meeting the academic requirement for registration as a Chartered IT Professional.

## Course information

**Level of study:** Postgraduate

**Fee (UK/Home):** £8,400

**Fee (International):** £16,000 (21/22)

**Entry requirements:** 2:2 honours degree, or equivalent in any subject IELTS 6.5, with no single element below 5.5, or equivalent .

**English language requirements:** IELTS 6.5, with no single element below 5.5, or equivalent

**Mode of study:** Full-time

**Duration:** 16-24 months

**Assessment methods:** Coursework

**Scholarships or bursaries:** available

**Student finance:** available

**Payment plan:** available

**Starts:** Jan, May, Sep,

# About this course:

## What will I study?

This MSc will explore the potential of technological solutions to some of the most pressing challenges faced by cities today. You will learn how big data technologies enable new opportunities for resource efficiencies, how IoT applications are empowering communities and the urban planning technologies (GIS, spatial data, building information modelling) available in designing sustainable cities.

You will be exposed to theories and principles relating to the design, development and testing of applications used in

smart cities. This includes the use of different methods and tools to collect, represent, manipulate and manage spatial data using Geographical Information Systems.

The programme introduces IoT infrastructure principles, and as part of your assessment, you will design an IoT solution for sustainable smart cities. You will also explore the value of blockchain to sustainable cities, using the Ethereum platform, you will develop practical skills through the programming of smart contracts in Solidity.

This programme is part of our computing framework which develops the essential skills required to develop you as a digital leader, building your knowledge of information governance, cyber security and research methods, as well as skills in communications, problem solving and commercial reasoning.

## How will I be taught and assessed?

* Teaching is delivered through lectures, workshops and tutorials totalling between **10-13 hours per week**
* You re expected to engage in independent study, around **30-32 hours per week**
* **Assessment** includes coursework, critical report writing, practical exercises, individual, group and research project work.
* Taught by **experienced lecturers and academics** who use their industry experience to demonstrate how theories translate into real-life situations.
* **Technology-enhanced** learning is embedded throughout the course to guide your preparation for seminars and independent research
* Benefit from **weekly academic support sessions** designed to build your ability and confidence as an academic learner
* You will be assigned a **guidance tutor** at induction who you will meet with regularly during your studies

## Advanced Practice stage

The Advanced Practice version of this course offers you a valuable opportunity to secure a work placement, complete a group consultancy based project on a real organisational issue or work with a research team on a research project. Successful completion of this Advance Practice stage will provide you with experience of the workplace environment or live computing issues and an excellent way to put your learning into practice.

This stage of the programme will take place between your second and final semester and is a semester-long (15 weeks) in duration. Internships as part of the Advanced Practice stage may be paid or unpaid. The alternative research module allows you to work with an academic or applied research team within the university on a range of research topics. Whether you choose the Internship, Group Consultancy Project or the Research Project, you will successfully develop your business or research skills and further enhance your employability.

**September starts**

If you choose to start your Masters in September, your programme will last for up to 21 months. You will have a summer break after Semester 2, and commence your Advanced Practice stage in September.

**January starts**

If you choose to start your Masters with Advanced Practice in January, your programme will run for 24 months. You will commence the Advanced Practice stage of the programme in January following your taught stage and summer break. Please note that there are two summer breaks included in this programme for those starting in January.

**May starts**

For those starting your Masters with Advanced Practice in May, you will start the Advanced Practice stage of the programme in January, straight after you have completed your second semester. Your programme will run for a total of 16-18 months. Please note that there is no summer break included in this programme for those starting in January.

The Advanced Practice programmes are structured as below:

|  | Sept-Jan | Jan-May | May-Sept | Sept-Jan | Jan-May | May-Sept | Sept-Jan |
|---|---|---|---|---|---|---|---|
| September starts | Semester 1 | Semester 2 | Summer break | Advanced Practice stage | Final semester |  |  |
| January starts |  | Semester 1 | Summer break | Semester 2 | Advanced Practice stage | Summer break | Final semester |
| May starts |  |  | Semester 1 | Semester 2 | Advanced Practice stage | Final semester |  |

## Careers and further study

This Masters programme prepares you for a range of careers in the field of urban planning for smart cities, including management and leadership in computing. Possible career routes available include:

- Urban planning in local and national government
- Government roles responsible for sustainability
- Technology and software development companies involved in smart city applications
- Consultancy firms

Typical job roles include:

- Sustainable City Designer
- Smart City Planner and Data Scientist
- IoT Infrastructure Designer
- Machine Learning Scientist
- Data Scientist
- Geospatial and Mapping Scientist
- Urban Informatics Analyst
- Blockchain Architect/Developer

Furthermore, this programme will prepare you to meet the educational requirements of the BCS, The Chartered Institute

for IT for the purposes of meeting the further learning academic requirement for registration as a Chartered IT Professional.

Upon successfully completing your course, you may undertake further professional development and training through Professional Pathways programmes. These are offered to our graduates for free, from our partner, QA. Find out more information on Professional Pathways and your eligibility.

Enquire now

# Entry requirements

## Academic requirements

- Minimum 2:2 honours degree, or equivalent in any subject

**If you don t meet the academic requirements**

Applicants who are not graduates and do not hold professional qualifications of equivalent standing can also be considered for entry if they show evidence of strong motivation and capability for academic study and personal development (e.g. evidence of attendance at short courses) and/or suitable experience of working in areas which involve a significant amount of Information Technology.

Please visit our entry requirements page for country-specific qualifications.

## English language requirements

- Students require an IELTS 6.5, with no single element below 5.5 or equivalent.

If you have IELTS 5.5 – 6.0, you may be eligible to join our Pre-Sessional English before starting this programme.

Enquire now

# Modules

All modules on this course are core and 20 credits unless otherwise stated

Information Governance and Cyber Security

In this module, you will learn about the information governance and cyber security principles that underpin the management of an organisation s information assets. You will critically analyse the key concepts, theories, standards and frameworks of information governance and security, including risk management.

It will enable you to evaluate an organisation s current approach to information governance and cyber security. You will have the expertise to advise on the design and implementation of an appropriate strategy for managing an organisation s information (ensuring all assets meet legal, regulatory, organisational and/or societal needs for information governance and cybersecurity).

## Leadership in a Digital Age

In this module, you will develop new knowledge and skills in leadership in a digital context.

These capabilities are essential for your career development. They enable you to become competent at the visioning, development and deployment of technological strategies and responses to challenges and opportunities in complex operating environments.

## Academic Language Skills for Computer and Information Sciences (0 credits)

This module is designed to support your transition in the use and practice of technical language and subject-specific skills around assessments and teaching provision in your chosen subject area.

The overall aim of this module is to develop your abilities to read and study effectively for academic purposes.

You will gain practical skills in analysing source material and using it in seminars and academic writing, whilst advancing your language and communications skills to a higher level.

## GIS for Smart Cities

This module aims to provide you with a critical review of the theory and practice of Geographical Information Systems (GIS), including the use of different methods and tools to collect, represent, manipulate and manage spatial data.

You will work in QGIS or a similar cross-platform to view, edit and analyse spatial data and will be introduced to C++ or Python to create plugins.

The module will further provide opportunities to appreciate the role of ethics, sustainability, privacy and security within the context of the use of GIS and spatial data exploration.

## Research Methods for Professional Practice

This module is designed to ensure you have the skills and knowledge to complete a postgraduate research project, relevant to Technology for Sustainable Cities and your career or future aspirations. As such, you will work closely with our careers and professional development specialists to consider the future opportunities post completion of your degree.  You will develop a career plan and reflective log considering how your learning from the programme can accelerate the achievement of this plan.

To further prepare you for this final research project, this module will familiarise you with the nature of research and project management and the processes involved. Research approaches and methods will be covered, including literature evaluation and review.

In this module, you will additionally explore and use several tools and techniques that are in use in the field of project management to ensure that projects are completed successfully.

## IoT for Sustainable Development

The module aims to provide you with a critical review of the Internet of Things (IoT) for sustainable development as a key requirement of smart city projects. For example, where IoT plays an important role in infrastructure as well as to encourage efficient collaboration between city authorities, residents and urban communities.

This module offers exciting learning opportunities where you will learn IoT challenges facing businesses and how to overcome such challenges with the use of appropriate techniques using research, design, development, plan, policies, cyber security and interpreting associated risks/threats to IoT infrastructures.

As part of your assessment you will analyse, design, develop, and implement a prototype of an IoT smart city solution.

## Blockchain for Sustainability

You will learn the application of blockchain technology and how to deal with the challenges faced by smart cities, using a range of methods and tools.

The module introduces you to the importance of blockchain and how it can add value to any sustainable development, underpinning blockchain technical skills, infrastructure and architecture.

You will work on the Ethereum platform and will programme smart contracts in Solidity, gaining practical hands-on experience.

## Computing and Digital Technologies Project (60 credits)

This module aims to enable you to undertake a substantial academic research project at the Masters level and present the results from this work in both written and oral forms. Your project itself will be a piece of independent and original research centred at the forefront of your programme discipline within the wider sphere of the computer science and digital technologies field.

You will experience the full life cycle of a research project- from initial conception and development of a research proposal, through a critical review of the literature, planning, design, implementation and analysis of your main research project, to final evaluation, reflection and dissemination.

You will be expected to consider and address the professional, ethical, legal and social issues related to this academic research project. You will also be expected to apply your expertise, project management and practical skills within your particular domain of computer science and digital technologies and demonstrate critical and innovative thinking and problem-solving within a research environment.

Your research proposal will normally have been produced as part of an earlier module on research and project planning but should be reviewed again at the start of the project phase to ensure it is still valid and appropriate.

## Advanced Practice stage

You will choose one of the following modules:

### Engineering and Environment Advanced Practice London Campus – Consultancy Project (60 credits)

This module aims to provide you with an experiential learning opportunity where you will work on a group consultancy project that utilises skills and knowledge acquired during the taught part of your study programme. You will work as a team of 3-5 students on a project for a real-world organisation and be supported by an experienced academic supervisor throughout your project.

You will learn to work independently and develop resilience and flexibility as you adapt to a different learning environment, and gain a new perspective through comparison with your taught studies. The module will help you develop your abilities as a problem solver with valued investigative, theoretical and practical skills to implement a work-based consultancy project. Through this consultancy project, you will help develop hands-on experience of working on a real-life project that experience is directly transferrable to be utilised to the world of work after your graduation.

### Engineering and Environment Advanced Practice London Campus – Research Project (60 credits)

The Advanced Practice Research Project module is designed to deepen your knowledge and enhance your research skills in your specialist field. The aim of this module is to provide you with an opportunity to work on a research study that utilises skills and knowledge acquired during the taught part of your study programme. You will be supported by an experienced academic supervisor who would provide guidance at different stages of this research project.

A high level of participation will be required from you to undertake this research project. Independent learning will help you focus on identifying and pursuing areas of interest in relation to the research study or by providing deeper/broader knowledge and understanding of the subject through a range of learning activities that might include extended reading, reflection, research etc and application of these to your research-based project. You will learn to work independently and develop resilience and flexibility as you adapt to a different learning environment, and gain a new perspective through comparison with your taught studies. The module will help you develop your abilities as a researcher with valued investigative, data analytical, theoretical and practical skills to implement a research project.

### Engineering and Environment Advanced Practice London Campus Internship (60 credits)

This Advanced Practice module is designed to deepen your knowledge and enhance employability in your specialist field. This module aims to provide you with an experiential learning opportunity in a workplace setting that utilises skills

and knowledge acquired during the taught part of your study programme. You will develop resilience and flexibility as you adapt to a different learning environment, and gain a new perspective through comparison with your taught studies.

You will be allocated an academic supervisor who would provide you support throughout your internship.

Assessment on the module is designed to focus on the awareness of the impact of the time spent in an external learning environment, on your knowledge and understanding of the discipline. You will be encouraged to critically engage with outside practices, and to reflect on your educational development in the context of the challenges posed by an unfamiliar social, cultural and economic environment.

Enquire now

## Fees and finance

### Tuition fees 2021/22

- **UK/Home students:** £11,400
- **International students:** £19,000

### Tuition fee 2022/23

- **UK/Home students**: £12,075
- **International students:** £19,500

Please note that your tuition fees do not include the cost of course books that you may choose to purchase, stationery, printing and photocopying, accommodation, living expenses, travel or any other extracurricular activities. As a Northumbria University London Campus student, you will have full access to our online digital library with over 400,000 e-books and 50,000 electronic journals.

What's included in your tuition fees?

Your tuition fees cover far more than your time in class with our expert academics, it covers the cost of providing you with excellent services and student experience.

- Contact time in class – typically in lectures, seminars and tutorials
- Access to facilities, including computers, on-campus Wi-Fi, printers, vending machines, quiet study spaces
- The support of our Careers & Employment Service helps you to become more employable, secure placements and run workshops
- Academic support – our ACE Team run multiple sessions on academic writing, presenting, exam techniques throughout the semester, as well as 1-2-1 appointments and drop-in sessions
- Student support services such as our Ask4Help Service. Find out more about the services available to you on our Student Support page
- Access to online resources, including 24/ 7 Library with over 400,000 e-books and 50,000 electronic journals.

## Scholarships and bursaries for international students

If you are an international student and choose to study the full-time programme, you will be eligible for either our programme bursary or a country bursary, whichever is greater. High performing students may be eligible for an academic scholarship in addition.

Depending on the country you are from, you may be eligible for one of our country bursaries and/scholarships to help finance your studies.

All of our scholarships and bursaries are automatically applied when we process your application and our team will be able to confirm your eligibility.

Scholarships and bursaries

## Payment plans for self-funded students

If you need to spread the cost of your tuition, you may be eligible for our payment plan.

Payment plans

## Government Loan for Masters study

If you are a UK/Home student, you may be eligible for a postgraduate loan of up to £10,000+ from the UK Government. Click here to find out more about the loan and whether you are eligible to receive it.

Postgraduate Loan

# How to apply or find out more

## How to find out more

Enquire now to find out more information about the course, studying with us, the application process, and to ask any other questions you may have.

Enquire now

# How to apply

Once you re ready to apply, you can apply online to study the MSc Technology for Sustainable Cities. This method allows you to upload your supporting documents at the time of application and automatically receive your student application number.

Apply online

We strongly recommend that you submit your application as early as possible to allow you to complete all of the preparations needed to study your programme. After receiving an offer it can take time to arrange your finances and apply for your visa (if required) and it is important that you arrive in good time to enrol onto your course. Please refer to the Dates and Fees page.

If you are unable to apply online, then you can download a PDF application form and email it to london.admissions@northumbria.ac.uk.

International students application form    UK/Home students application form

**Supporting documents**

For us to assess your application in a timely manner, it is important that you provide us with the following documents:

- Fully completed application form
- A personal email address must be included on the application form
- Transcripts and/or certificates (including a certified translation if not in English)
- Passport – a copy of personal details page
- Proof of financial sponsorship if applicable
- Reference
- Confirmation of immigration history including copies of previous and current visas if applicable

You can check more information on how to apply here, including guidelines for the application forms.