

Imperial College
London

INSTITUTE FOR
SECURITY SCIENCE
AND TECHNOLOGY

Master of Science (MSc) Programme

Security and Resilience: Science and Technology

- Full-Time / 1-year
- Part-Time / 2-years
- Start date: October

Train in the science and
cutting-edge technologies
that underpin global security

Facts & figures

1ST
Graduate employability

The Guardian University Guide 2022

2ND
Most innovative

Reuters' Europe's Most Innovative Universities 2018

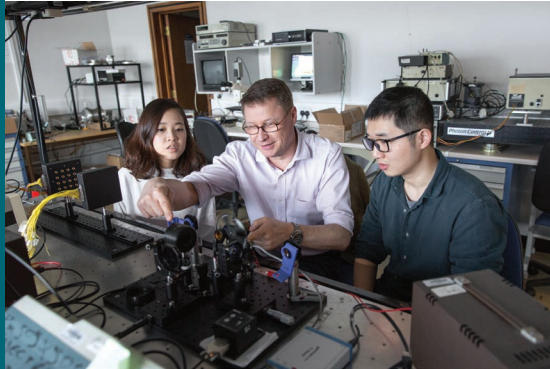
3RD in Europe | **6TH** in the world

QS World University Rankings 2023

3RD in Europe | **12TH** in the world

Times Higher Education World University Rankings 2022

£363M
Research grants and contracts 2020–21



Accelerate your career & learn from the best

Rigour, excellence and global expertise: hallmarks of an Imperial College London MSc degree.

You will be taught the specialised knowledge and essential transferable skills needed to take your career to the forefront of the security and resilience sector.

“Imperial brings together top innovators in the field to help address pressing security challenges facing society.”

— PROFESSOR DEEPH CHANA,
ISST Director

WHY IMPERIAL?

Learn from leading security experts with significant real-world experience in government, industry and academia. Explore cutting-edge research and the latest innovations in the fast-moving security field.

We're consistently rated in the top five UK universities and in the top twenty worldwide. Imperial has the highest proportion of world-leading and internationally excellent research of any UK university (Research Excellent Framework, REF).

Our reputation among researchers and employers provides you with a degree that is valued worldwide. By studying with us you benefit from global recognition of our innovative environment and world-leading teaching and research.

THE INSTITUTE FOR SECURITY SCIENCE AND TECHNOLOGY

Imperial's Institute for Security Science and Technology (ISST) created this MSc in response to the demand for suitable professionals in industry, academia and government partners.

The ISST is one of Imperial's Global Institutes, serving as an interface between Imperial and the external world.

Drawing on the diverse expertise across Imperial, the ISST works with academics, international governments, conglomerates and start-ups to solve problems throughout the global security landscape.



Build cutting-edge skills, knowledge and ideas

HOW THIS COURSE IS UNIQUE

Our MSc is significantly different to other security courses on offer.

Many courses focus exclusively on specific technical areas like cyber security, or exclusively on the qualitative and policy aspects of security.

Our course deliberately covers multiple technical areas, and positions itself at the interface between quantitative and qualitative frameworks.

Candidates to our programme

We attract exceptional graduates and security professionals and provide them with fundamental conceptual tools to address wide ranging challenges in security and resilience. Candidates are generally from STEM backgrounds, but we also have a number of students with other relevant studies or professional experience.

Graduates of our MSc stand out in an increasingly competitive globalised job market. Our graduates are in demand at some of the world's leading companies and in the most competitive sectors in government, academia and industry. Furthermore, the course equips students to pursue their entrepreneurial ambitions and develop innovative companies.

Equality, diversity and inclusion is a core focus of ours.

Gold

Stonewall's Top 100 Employers List for LGBTQ+

~50%

Male/Female Ratio in ISST MSc

Silver

Athena SWAN Charter

Bronze

Race Equality Charter (REC)



WHAT YOU WILL STUDY

This course is led by Imperial's Institute for Security Science and Technology, whose activities span many technologies and application domains of security and resilience, such as cyber, AI, critical infrastructure and space.

The course is intentionally broad in focus, giving you a grounding in the most important and relevant science, technologies and application domains. This sets you up for a range of career trajectories in a world of ever-changing security concerns.

You will benefit from core training in risk evaluation and both qualitative and quantitative research methodologies; essential skills underpinning the security and resilience sector, as well as allied sectors.

“This course exists to unlock the potential of intellectual and driven students by engaging them in real-world problems and real-world people, with the help of expert mentorship.”

— DR JOSÉ VIDEIRA, Imperial alumni & CEO of Synbiosys

Programme topics include:

- Artificial intelligence
- Behavioural science
- CBRNE
- Critical infrastructure
- Cyber security
- Detection and sensing technologies
- Quantum technologies
- Threat mitigation and policy
- Transport security

Methods/techniques covered:

- Behavioural analysis
- Cryptographic protocols
- Data analysis
- Intelligence gathering
- Machine learning
- Monte Carlo risk analysis
- Social network analysis
- Spectroscopy

Imperial offers an MSc degree designed to fit your career goals & life circumstances.

FULL-TIME	Graduates and professionals looking to launch, expand or switch their careers or job functions quickly with a full-immersion style of learning.	1 year
PART-TIME	Professionals aiming to gain skills to advance their careers and open opportunities alongside their work.	2 years

- Case studies
- Computational exercises
- Individual & group project work
- Laboratory work
- Lectures
- Online discussions
- Workshops

PROGRAMME STRUCTURE

Core modules

The course provides a challenging and collaborative environment, guided by academics and professionals experienced in the field.

The seven core modules provide a solid grounding in science and technology underpinning real-world challenges and solutions. A final independent research project is completed in consultation with an academic supervisor, and there are opportunities to complete a project sponsored by one of our industry partners. Several shorter projects will be also completed as a group during the course.

Elective modules

The core modules can be complemented by taking one or more elective modules available from across Imperial's programmes. These can be taken either in addition to, or in place of, the core modules (were comparable studies have already been completed).

Some of the most popular modules are listed below, while others can be selected from across the College where relevant.

- Air Traffic Management
- Computational Finance
- Cryptography Engineering
- Entrepreneurship for Physicists
- Graphics
- Hacking 4 Security
- Privacy Engineering
- Principles of Distributed Ledgers



7 CORE MODULES	MODULE DESCRIPTION
Key Concepts: Security in Context	Brings the technical, engineering and scientific aspects of security together. Through a series of vignettes and interactions with practising security professionals, it outlines the relevance and applications of concepts from other modules.
Behavioural Research Methods	Examines behavioural data and how to best obtain reliable information from sources such as interviews, focus groups, sorting tasks, existing sources and observational materials. The module then looks at systematic analysis of behavioural data for the conversion of raw material into reliable and valid research data.
Behavioural Science and Security	Examines the ways in which behavioural science research has been used to inform security. The different types of threat actors are considered with their aims and targets. The role of media, and managing the positive and negative potential of both the mainstream and social media, is discussed.
Network and Web Security	Provides a broad knowledge base of network and web security from the network to the application layer. The emphasis of the course is on both the underlying principles and techniques, and on examples of how such principles are applied in practice.
CBRNE: The Physical Threat Space	Introduces the history and underlying science of CBRNE and environmental security. For each of the CBRNE elements, physical properties, detection/measurement techniques, impacts and mitigation will be discussed.
Sensors: Electronic and Natural	Explores the principles of environmental sensing, highlighting the context of point and standoff detection/sensor systems. A range of different detection technologies will be covered, including structure-based, chemistry-based and function-based sensors.
Infrastructure and Transport Security	Focuses on the security of critical national infrastructure and transport systems, introducing the student to key concepts of both, and how security vulnerabilities are analysed. The effects of Blast and Impact on the built environment are looked at. Mitigation techniques and the implications these have for policy are covered, and the concept of 'secure by design' is introduced relating to transport systems.
Individual Research Project	Complete an individual research project with the guidance of an academic supervisor. Industry sponsored projects available.

Explore your career paths

This course is designed to equip you with a broad range of skills which are in strong demand across industry, policy and academic sectors.

Recent graduates have joined organisations including Amazon, IBM iX, Ernst and Young, Greater Manchester Police, The Aerospace Corporation and others.



Industry

With our MSc degree, you will be well positioned for a career in the security and resilience sector, which employs over 100,000 people in the UK alone. At the ISST, we have connections with major companies in the security sector, giving you valuable insight into potential employers, roles and their requirements.

Entrepreneurship

Recent start-ups launched at Imperial are working in cyber security, next-generation armour and facial recognition. As a student, you'll have access to the Enterprise Lab and Advanced Hackspace, which offer state-of-the-art spaces for prototyping and co-working, as well as mentoring, skills-building programmes and competitions for funding.

Policy

Governments need staff who understand how the science and technology behind security and resilience can inform policy, and this is considered throughout the course. You will also learn from staff who have experience of working with various branches of UK Government.

Academia

Studying at a research-intensive university means joining a community of world-class researchers. You will have the chance to work alongside leading experts, discuss cutting-edge developments and actively engage with the latest discoveries in the security sciences. This lays a solid foundation for graduates looking to move on to PhD study.

Support for developing your career

Expert guidance & advice

We will help you explore, develop, and shape your future. Our team of careers consultants and advisers provide experienced support for you to explore options, connect with employers, and navigate the complex global job market.

With online resources and publications, workshops, presentations, employer events and one-to-one appointments, we are well equipped to help you develop a strategy to achieve your career goals.

“The knowledge that I gained over the MSc has been invaluable to me in my graduate role as a Cyber Security Analyst at KPMG.”

— JACK WALSH, MSc Alumni

A global alumni community

As a graduate of Imperial College London you will benefit from a powerful global network of 210,000+ alumni, providing you with lifelong career development and networking opportunities.

SPOTLIGHT

Hacking 4 Security module

H4S is an interdisciplinary and entrepreneurial module in which teams apply lean start-up methods to solve a real national security or defence relevant problem.

It gives students exposure to a fast-paced innovation environment and skills which are directly relevant for any career path.

In previous years, teams have looked at using satellite imagery for mission planning, creating a self-sufficient water supply solution for hard to reach locations, and developing data dashboards to manage the availability of aircraft assets.

“Hacking for Security was an incredible hands-on course, not like one I’ve experienced before. This experience allowed me to understand the benefits of diversified mindsets and perspectives when problem solving”

— FURRAH HUSSAIN, MSc Security and Resilience graduate

Discover Imperial's innovative campuses

SOUTH KENSINGTON CAMPUS

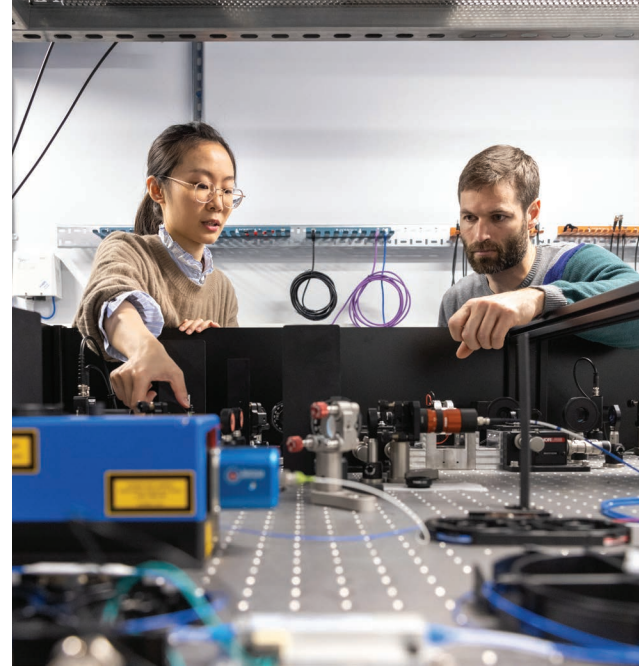
Our main campus is in South Kensington, just south of Hyde Park in the heart of cosmopolitan London. We are moments away from some of the city's finest museums, royal parks, restaurants and shops.

Our campus is home to world-leading scientists and innovators researching at the cutting-edge of security-relevant disciplines, such as quantum technologies, electrochemical sensors, cyber security, communications technologies, data analysis, artificial intelligence and autonomous systems.

The South Kensington campus and the Institute for Security Science and Technology is the natural focal point for this activity, with more than 150 affiliated academics drawn from across every department.

“*Imperial is the epitome of scientific knowledge, not to mention the spectacular campus buildings located in South Kensington.*”

— MARIA VILLAMIL,
MSc Student



MULTIDISCIPLINARY NETWORKS, CENTRES AND INSTITUTES

We draw upon a wide pool of affiliated researchers from various disciplines across Imperial.

- Artificial Intelligence Network
- Centre of Excellence in Cyber Security Research
- Centre for Cryptocurrency Research and Engineering
- Centre for Financial Technology
- Centre for Blast Injury Studies
- Centre for Quantum Engineering, Science and Technology
- Centre for Transport Studies Sensors Network
- Data Science Institute
- Institute for Security Science and Technology
- Institute of Shock Physics
- Machine Learning Initiative
- Research Institute in Trustworthy Inter-Connected Cyber-Physical Systems
- Space Lab

“Working with Imperial provides us with the opportunity to accelerate technology development through fresh thinking and diverse ideas.

— MATT CLARK, Smiths Group



WHITE CITY CAMPUS

White City Campus is Imperial's 23-acre campus in west London that is easily accessible via public transport. Bringing together world-class researchers, businesses and partners from academia, this campus is a global beacon for innovation and growth.

Imperial has a long and successful history of partnership and collaboration with industry. We work with more than 500 corporate partners and at White City we can bring academia, business and the community together on an unprecedented scale.

Innovation is a central theme of our work

We host the ISST Innovation Ecosystem at Imperial College London's White City campus, which co-locates major security and defence companies, government agencies, universities and start-ups to tackle security and defence challenges.

We also host the European headquarters for NATO's Defence Innovation Accelerator for the North Atlantic (DIANA), as well as the London Tech Bridge, an innovation ecosystem with the US Department of the Navy, the UK's Ministry of Defence, and the Royal Navy.

OUR PARTNERS

Working with multiple partners, we drive new research projects and technology transfer in security/defence. By operating a co-location model, we enable interaction and engagement to accelerate opportunity creation.

Academia

- Cranfield University
- Imperial Business Partners
- Imperial Centre for Transport Studies
- Imperial College Business School
- Imperial FinTec Network
- Imperial Sensors Network
- Imperial Space Lab

Government

- Defence and Security Accelerator (DASA)
- NATO Innovation Accelerator
- NavalX London Tech Bridge
- US Air Force Research Laboratory
- US Army Devcom
- US Office of Naval Research Global

Industry

- Airbus
- BAE Systems
- BMT Group
- Capita Consulting
- Northrop Grumman
- Rolls-Royce
- SAAB
- Smiths Group
- Wavestone

Start-ups

- DEFEND3D
- Icen Labs
- ORCA Computing
- Quair
- Sybiosys
- Uplift 360
- Valkyrie Industries

Apply today

Duration of programme:

Full-time 1-year • Part-time 2-years

Fast-track with a full-time course and finish in 12 months. Or complete your studies in 24 months while studying part-time. This option is available to students and organisations who need to balance between employment and study.

Start date

The course starts annually in October.

Minimum entry requirements

This course is open to all STEM graduates with a minimum of an Upper Second Class (2.1) UK Honours degree.

Non-STEM graduates who can demonstrate sufficient knowledge of technical and/or mathematic concepts are welcome to apply.

Candidates without the relevant academic background but with significant relevant work experience are also encouraged to apply.

We accept a wide range of comparable international qualifications. For further information see: www.imperial.ac.uk/study/pg/apply/requirements/pgacademic

Fees and financing

The level of tuition fees you pay is based on your fee status, which we assess based on UK government legislation. Find out more: www.imperial.ac.uk/study/pg/fees-and-funding

Financial support

We have capacity to support a limited number of students with tuition fees. Where needed, we can also support some students in making the application fee. For more information, please visit www.imperial.ac.uk/study/securitymsc

How to apply

You need to apply direct to the College via our online application system. For further guidance see: www.imperial.ac.uk/study/pg/apply/how-to-apply

GOT A QUESTION?

Connect with us to learn more about the programme.

E: securityscience@imperial.ac.uk



“Being surrounded by exceptional students encourages you to be better, and fosters resilience and adaptability, which are essential in challenging times. When you tell people you learned your trade at Imperial, it’s met with a lot of respect.”

— ARJUN PANESARI, Imperial alumni



INSTITUTE FOR
SECURITY SCIENCE
AND TECHNOLOGY

www.imperial.ac.uk/study/securitymsc