Imperial College London

GLOBAL CHALLENGE

Discovery and the natural world

Postgraduate courses
2021–2022 entry

Top 10

Consistently ranked amongst the top 10 universities in the world

QS World University Rankings 2021

1st

in the UK for graduate employability

The Guardian University Guide 2021

1st

Most innovative university in the UK (2nd in Europe)

Reuters World Top 100 Most Innovative Universities 2020

No.1

Located in the world's best student city

QS Best Student Cities 2019

Find your way to Imperial

Imperial is home to a global community of scientists, engineers, medics and business experts who are using their diverse talents to find solutions to some of the world's biggest challenges – from researchers working on a climate-friendly COVID-19 recovery plan to engineers leading our Transition to Zero Pollution programme (page 3).

This guide brings together our Master's and Doctoral courses relating to our global challenge of **discovery and the natural world**.

This is one of four global challenges (see the back cover) that guide the way our community works together across subject boundaries to find solutions to some of humanity's biggest problems – like global pandemics, reducing global emissions, combatting food insecurity and maintaining data security.

Find the right Master's course for you

To help you find the right Master's course for you in this guide, we have grouped them by theme, rather than by department.

These broader categories are designed to help you explore all the way you could contribute to making the world a healthier place – it may not be in a way you previously considered or in the department that matches your first degree.

What's more, it may lead to a career you never imagined or a job that doesn't yet exist.

Doctoral courses

Our Doctoral students have the chance to be true pioneers in their field by creating brand new knowledge. See pages 20–21 to discover our Doctoral courses relating to discovery and the natural world.

Many of our departments welcome students whose background is not in the same area of science or engineering.

COVID-19

These are unprecedented times for all of us. This guide presents our courses for 2021–2022 as they would operate under normal circumstances. We may have to make changes should restrictions still be in place as a result of COVID-19. Please keep an eye on our website for information about potential course changes for the 2021–2022 academic year.

- **www.imperial.ac.uk/study/covid-19**

A UNIQUE

science community

At Imperial, you will join a community of world class researchers and gain a unique insight into work to tackle some of the world's biggest challenges. It's work that unites our experts across subject boundaries, drawing on the wealth of talent that exists in our global top ten institution.

Our work to help find a balance between our human-centric society and the environment relies on us building a better understanding of how to optimise and conserve the world around us. We're guided in this work by a number of questions.

What if we could...

- quantify and reduce the impact of environmental and climate change?
- deliver water, energy and minerals that are secure, sustainable and affordable?
- understand the mechanisms which influence how humans make decisions?
- identify the unknown 95% of the universe?

Read more about the work we're already doing to address these challenges (see right).

Making an impact

Our research-led approach also shapes the way we educate our students through teaching that opens everything up to question. It's a style of education that relies on learning by discovery, rather than memorising facts.

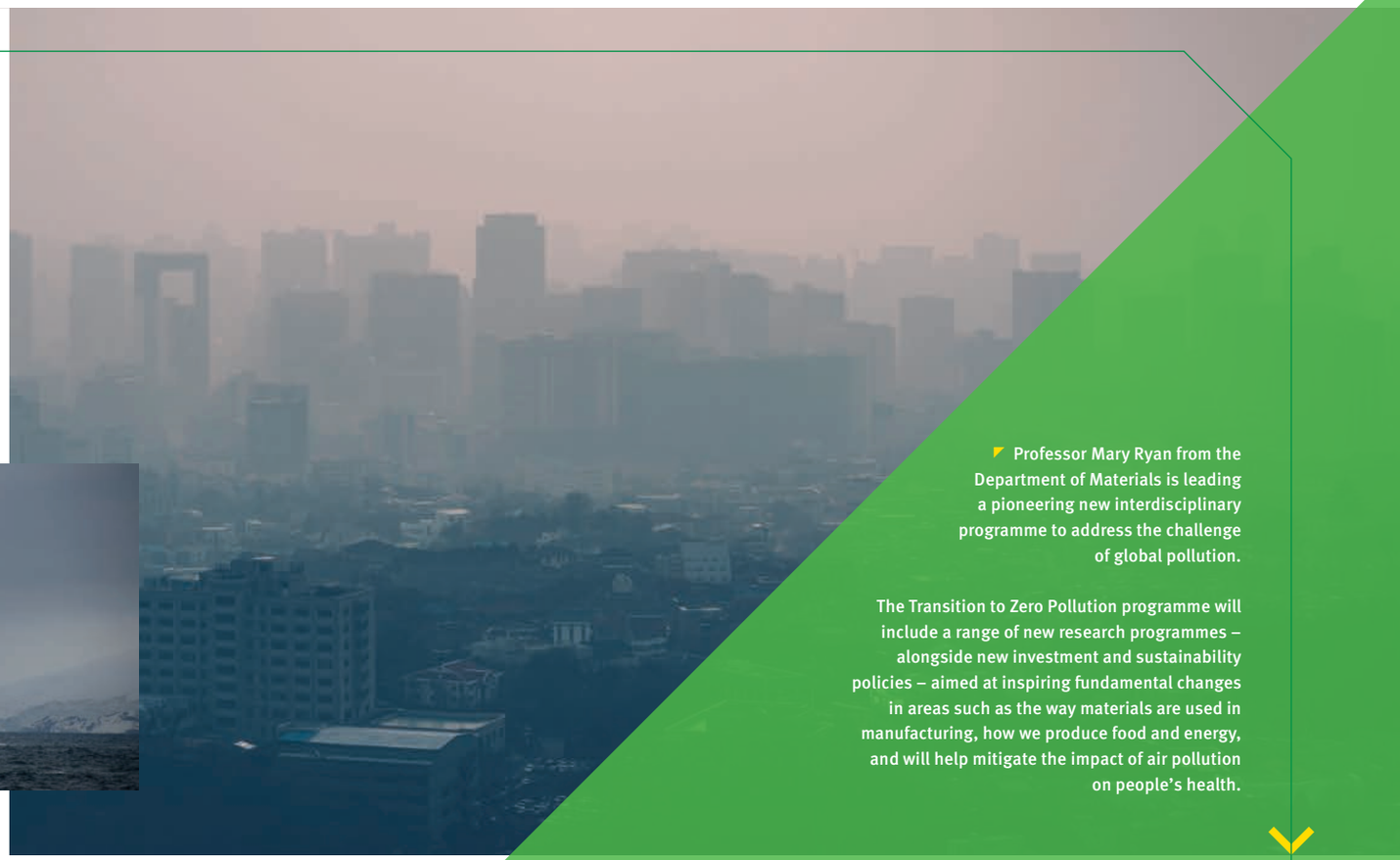
▲ Helen O'Brien in the Department of Physics is the lead engineer for a new Imperial-built instrument onboard the recently launched Solar Orbiter, a joint European Space Agency (ESA) and NASA mission to study the Sun. Imperial's instrument has already started sending back data to Earth which will be analysed to better understand the Sun's magnetic field.

▼ Researchers from the Department of Life Sciences, led by Dr Richard Gill, have used micro-CT scanning technology to reveal how specific parts of bumblebee brains grew abnormally when exposed to pesticides during their larval phase, affecting their ability to perform simple learning tasks as adults. The research team suggests their work highlights the need for guidelines on pesticide usage.

▲ Professor Vincent Savolainen from the Department of Life Sciences is the Imperial lead of a new project to map COVID-19 in raw sewage. The team will sample rivers and animal faeces in the environment for the presence of the coronavirus to assess whether sewage could be a source of new infections, either directly or through animal hosts, such as rodents and bats.

▼ Imperial experts have predicted that sustained Antarctic warming of just 2°C could melt the largest ice sheet on Earth. Professor Tina van de Flierdt from the Department of Earth Science and Engineering, co-author of the international research study, has warned that the melting of the ice sheets will lead to global sea level rise and threaten coastal regions around the world.

Christina Riesselman



▶ Professor Mary Ryan from the Department of Materials is leading a pioneering new interdisciplinary programme to address the challenge of global pollution.

The Transition to Zero Pollution programme will include a range of new research programmes – alongside new investment and sustainability policies – aimed at inspiring fundamental changes in areas such as the way materials are used in manufacturing, how we produce food and energy, and will help mitigate the impact of air pollution on people's health.

WHERE COULD AN

Imperial degree lead you?

A postgraduate degree from Imperial will provide you with an excellent foundation for your future. Here are just a few members of our 200,000-strong global alumni community who are building on their Imperial education.

The Shellworks

As the UK's most innovative university, a natural career path for many Imperial graduates and students is using their creative and entrepreneurial talents to launch new ideas into the world.

Insiya Jafferjee (MSc/MA Innovation Design Engineering 2019) is co-founder of The Shellworks. The startup won the Imperial Venture Catalyst Challenge 2020 for their sustainable packaging created from seafood waste.

Nick Paget, Emile De Visscher, Christophe Machet and **Audrey Gaulard** (MA/MSc Innovation Design Engineering 2012) are the founders of The Polyfloss Factory. The process, inspired by candy-floss machines, transforms waste plastic into a new raw material, whose uses include insulation for emergency shelters in refugee camps, packaging and product design.

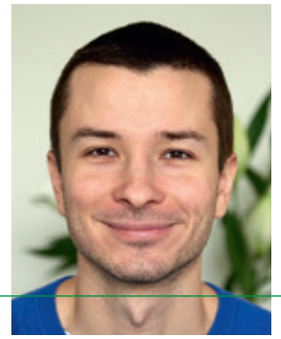
Dr Emanga Alobwede (MSc Environmental Technology 2012) is a postdoctoral research associate at Imperial and the co-founder of BIO-F Solutions, who are transforming the way our food is produced by developing eco-friendly fertilisers based on natural micro-organisms.

Yin Noe (MSc Innovation, Entrepreneurship and Management 2018) launched Coillection, a social enterprise tackling the improper disposal of household cooking oil waste. Instead of pouring oil down the drain, Coillection's technology converts used cooking oil into biodiesel, a carbon neutral fuel and an important renewable energy source.

Melissa Schiele (MSc Conservation Science 2018) is a Drone Technician for the Zoological Society of London. As part of her research, Melissa pilots a drone to help identify and study the different marine life and illegal 'fisherfolk' in tropical marine protected areas around the world.

Yousef Alshammari (PhD Chemical Engineering Research 2013, pictured right) is Research Scientist, Oil Market Analyst and the Editor-in-Chief at CMarkits. His current work focuses on understanding oil market dynamics and price trends. He also sits as an expert with organisations including World Energy Council and United Nations Economic Commissions for Europe.

Amelia Womack (MSc Environmental Technology 2013) is Deputy Leader of the Green Party of England and Wales. She uses her platform to highlight problems affecting young people and works across a wide range of social and environmental issues, with a particular focus on flooding, climate change, women's rights and community resilience.



Jeremiah Smith (MSc Computing 2011, PhD 2015) kick-started his career as a tech entrepreneur during his time at Imperial, where he twice won the Enterprise Lab's Venture Catalyst Challenge. He is now co-founder and Chief Product Officer of environmental startup CarbonChain, enabling companies in the commodities sector to measure the emissions in their supply chains.

Want to know more?

Delve into the data about what our graduates do on our Careers website at:

www.imperial.ac.uk/careers/exploring-your-options/destinations/postgraduates

Master's courses by theme

Our interdisciplinary approach means our expertise often spans departmental boundaries. And so do our courses, so you may find a course of interest in an unexpected area of the College, or a way to follow your interests you never previously considered.

Themes in this guide

This guide contains Master's courses relevant to our global challenge of **discovery and the natural world**. To help you search your study options in this area, we've grouped our Master's courses together under the following themes:

- **Artificial intelligence, robotics and machine learning**
- **Big data, computational modelling and mathematical methods**
- **Biomedical science**
- **Biosciences**
- **Ecosystems and the environment**
- **Energy futures and resource management**
- **Entrepreneurship**
- **Fluid mechanics**
- **Materials science and product innovation**
- **Medical technology**
- **Molecular science**
- **Policy and communication**

To learn more about all our Master's courses visit:

- **www.imperial.ac.uk/study/pg/courses**

Artificial intelligence, robotics and machine learning

The design and engineering of robotic technology and computer software that can learn and adapt to its environment without being programmed.

Course		Department	Faculty	Entry requirements
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MSc	Artificial Intelligence	Computing	Engineering	First class Honours in mathematics, physics, engineering or other degree with substantial mathematics content.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Environmental Data Science and Machine Learning	Earth Science and Engineering	Engineering	As above.

Big data, computational modelling and mathematical methods

The analysis of large data sets to reveal trends and patterns and make predictions.

Course		Department	Faculty	Entry requirements
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Applied Mathematics	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics, engineering or physics.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	2:1 in a life sciences or physical sciences subject. A suitable grounding in mathematics is desirable e.g. A-level grade B or higher.
MSc	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	As above.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Data Science and Machine Learning	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).

Continued on the next page

Big data, computational modelling and mathematical methods (continued)

Course		Department	Faculty	Entry requirements
MSc	Global Statistics (Online) *See MSc Statistics for streams on this course*	Mathematics	Natural Sciences	2:1 in statistics, mathematics, engineering or physics.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Mathematics and Finance	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics or physics.
MRes	Molecular Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MSc	Pure Mathematics	Mathematics	Natural Sciences	2:1 in mathematics or applied mathematics.
MSc	Quantum Fields and Fundamental Forces	Physics	Natural Sciences	First class Honours in physics or mathematics with theoretical physics options.
MSc	Statistics streams: ▸ Applied Statistics ▸ Biostatistics ▸ Data Science ▸ Statistical Finance ▸ Statistics ▸ Theory and Methods	Mathematics	Natural Sciences	2:1 in statistics, mathematics, engineering or physics.

For a directory of courses by A–Z and by department, please see our Study website:

▸ **www.imperial.ac.uk/study/pg/courses**

Biomedical science

▸ **A highly interdisciplinary field of biology with practical applications in medicine, healthcare and laboratory diagnostics.**

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

Biosciences

▸ **The scientific study of living organisms (humans, plants and animals) – from molecules and cells to human health and disease.**

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Biosystematics	Life Sciences	Natural Sciences	2:1 in a biological or environmental subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Plant and Microbial Sciences	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.
MSc	Taxonomy, Biodiversity and Evolution	Life Sciences	Natural Sciences	2:1 in biology or a related subject.

Ecosystems and the environment

The interdisciplinary study of the environment and the solutions to the environmental problems we face.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MRes	Biological and Physical Chemistry	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Biosystematics	Life Sciences	Natural Sciences	2:1 in a biological or environmental subject.
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MRes	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	2:1 in a life sciences or physical sciences subject. A suitable grounding in mathematics is desirable e.g. A-level grade B or higher.
MSc	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	As above.
MSc	Earthquake Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Ecological Applications	Life Sciences	Natural Sciences	2:1 in a science subject.
MSc	Ecology, Evolution and Conservation	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecology, Evolution and Conservation Research	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecosystems and Environmental Change	Life Sciences	Natural Sciences	2:1 in a science subject. Applicants will ideally have experience in environmental research or policy and a strong interest in pursuing a research career.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Data Science and Machine Learning	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	See Environmental Engineering above.
MRes	Molecular Plant and Microbial Sciences	Life Sciences	Natural Sciences	2:1 in a science subject.
MSc	Petroleum Geoscience	Earth Science and Engineering	Engineering	2:1 in earth sciences. Applicants with closely related earth/environmental science degrees (such as physical geography or oceanography) or industrial experience will also be considered.
MSc	Soil Mechanics	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Soil Mechanics and Engineering Seismology	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Soil Mechanics and Environmental Geotechnics	Civil and Environmental Engineering	Engineering	As above.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.
MSc	Taxonomy, Biodiversity and Evolution	Life Sciences	Natural Sciences	2:1 in biology or a related subject.
MRes	Tropical Forest Ecology	Life Sciences	Natural Sciences	2:1 in a science-based subject.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Energy futures and resource management

Exploring how sustainable technologies and the management of energy and natural resources can help to address global energy issues.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	As above.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Chemical Engineering with Structured Product Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MRes	Biological and Physical Chemistry	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MSc	Ecological Applications	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecology, Evolution and Conservation Research	Life Sciences	Natural Sciences	As above.
MSc	Ecology, Evolution and Conservation	Life Sciences	Natural Sciences	As above.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Future Power Networks	Electrical and Electronic Engineering	Engineering	First class Honours (minimum of 75% overall) in electrical/electronic engineering or a related subject with a substantial electrical/electronic engineering component.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MSc	Metals and Energy Finance	Earth Science and Engineering	Engineering	2:1 in engineering, physical sciences or economics with a substantial mathematics component. Appropriate experience, while not essential, would be an advantage.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Soft Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Entrepreneurship

Developing the knowledge and skills to design, launch and manage a new business or startup.

Course		Department	Faculty	Entry requirements
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Innovation, Entrepreneurship and Management	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MSc	Mathematics and Finance	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics or physics.
MSc	Metals and Energy Finance	Earth Science and Engineering	Engineering	2:1 in engineering, physical sciences or economics with a substantial mathematics component. Appropriate experience, while not essential, would be an advantage.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Fluid mechanics

The application of the laws of force and motion to liquids and gases.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Applied Mathematics	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics, engineering or physics.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Data Science and Machine Learning	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MRes	Molecular Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

Materials science and product innovation

Understanding the physical and chemical properties of materials to create innovative new products.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Mechanical Engineering	Mechanical Engineering	Engineering	First class Honours in science or engineering.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MSc	Concrete Structures	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MSc	General Structural Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MRes	Molecular Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Soft Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MSc	Structural Steel Design	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).

Medical technology

Developing technology to diagnose, monitor and treat the diseases and conditions that affect us.

Course		Department	Faculty	Entry requirements
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MRes	Bioimaging Sciences	Chemistry	Natural Sciences	2:1 in a science, technology, engineering or medicine subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Optics and Photonics	Physics	Natural Sciences	2:1 in physics, mathematics or electrical engineering. Relevant industry experience may also be considered (Special Qualifying Exam required).
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Molecular science

The study of molecular materials, including our cells and DNA, and their application in the real world.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MRes	Bioimaging Sciences	Chemistry	Natural Sciences	2:1 in a science, technology, engineering or medicine subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Biological and Physical Chemistry	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Catalysis: Chemistry and Engineering	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical sciences content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MSc	Physics with Quantum Dynamics	Physics	Natural Sciences	As above.
MRes	Soft Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

Policy and communication

Exploring how effective communication strategies and cultural policies can help address global and regional problems.

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	See Environmental Engineering above.
MSc	Science Communication	Science Communication Unit		2:1 in a scientific or science-related subject.
MSc	Science Media Production	Science Communication Unit		2:1 in a scientific or science-related subject.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.
MSc	Transport	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industry experience may also be considered (Special Qualifying Exam required).

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Doctoral courses

PhD (traditional route)

An intensive academic qualification involving a series of progression milestones which you must meet along the way. Find out more and check whether funded studentships are available at:

www.imperial.ac.uk/study/pg/courses/doctoral-courses/phd

Course		Department	Faculty	Entry requirements
PhD	Chemical Engineering Research	Chemical Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Chemistry Research	Chemistry	Natural Sciences	As above.
PhD	Civil Engineering Research	Civil and Environmental Engineering	Engineering	As above.
PhD	Clinical Sciences Research	Institute of Clinical Sciences	Medicine	2:1 in an appropriate subject, or equivalent. Master's degree is preferable, but not essential: **www.lms.mrc.ac.uk/study-here/phd-studentships**
PhD	Earth Science and Engineering Research	Earth Science and Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Electrical Engineering Research	Electrical and Electronic Engineering	Engineering	As above.
PhD	Environmental Research	Centre for Environmental Policy	Natural Sciences	As above.
PhD	Life Sciences Research	Life Sciences	Natural Sciences	As above.
PhD	Mathematics Research	Mathematics	Natural Sciences	As above.
PhD	Medical Research Council Studentships, offered by Imperial College Medical Research Council Doctoral Training Partnership (DTP)	Various	Various	**www.imperial.ac.uk/mrc-dtp-studentships**
PhD	Petroleum Engineering Research	Earth Science and Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Physics Research	Physics	Natural Sciences	As above.
PhD	Quantitative and Modelling skills in Ecology and Evolution (QMEE), offered by the NERC Centre for Doctoral Training (CDT)	Life Sciences	Natural Sciences	www.imperial.ac.uk/qmee-cdt
PhD	Science and Solutions for a Changing Planet, funded by NERC and hosted by the Grantham Institute – Climate Change and the Environment	Various	Various	**www.imperial.ac.uk/grantham/education/science-and-solutions-for-a-changing-planet-dtp**
PhD	Science Communication Research	Science Communication Unit		2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.

Integrated PhD (1 + 3)

Integrated PhD courses typically consist of a one-year Master's course (MSc or MRes) which leads straight into a three-year PhD.

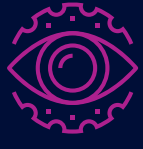
The following opportunities are covered by funded studentships, which are available to Home students. Self-funded Overseas applicants should enquire directly to the relevant centre for information on eligibility.

www.imperial.ac.uk/study/pg/courses/doctoral-courses/integrated-phd

Course		Department	Faculty	Entry requirements
MRes + PhD	Advanced Molecular Synthesis, offered by the EPSRC Centre for Doctoral Training (CDT) in Next Generation Synthesis and Reaction Technology	Chemistry	Natural Sciences	**www.imperial.ac.uk/next-generation-synthesis-reaction-technology**
MRes + PhD	BioDesign Engineering, offered by the EPSRC Centre for Doctoral Training (CDT)	Life Sciences	Natural Sciences	**www.imperial.ac.uk/synthetic-biology/cdt-biodesign-engineering**
MRes + PhD	Chemical Biology: Innovation in Life Sciences, offered by the EPSRC Institute of Chemical Biology Centre for Doctoral Training (CDT)	Chemistry	Natural Sciences	**www.imperial.ac.uk/chemical-biology/cdt**
MRes or MSc + PhD	Medical Research Council Studentships, offered by Imperial College Medical Research Council Doctoral Training Partnership (DTP)	Various	Various	**www.imperial.ac.uk/mrc-dtp-studentships**

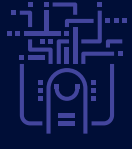
Imperial College London

Discovery and the natural world



Engineering novel solutions

Health and wellbeing



Leading the data revolution

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