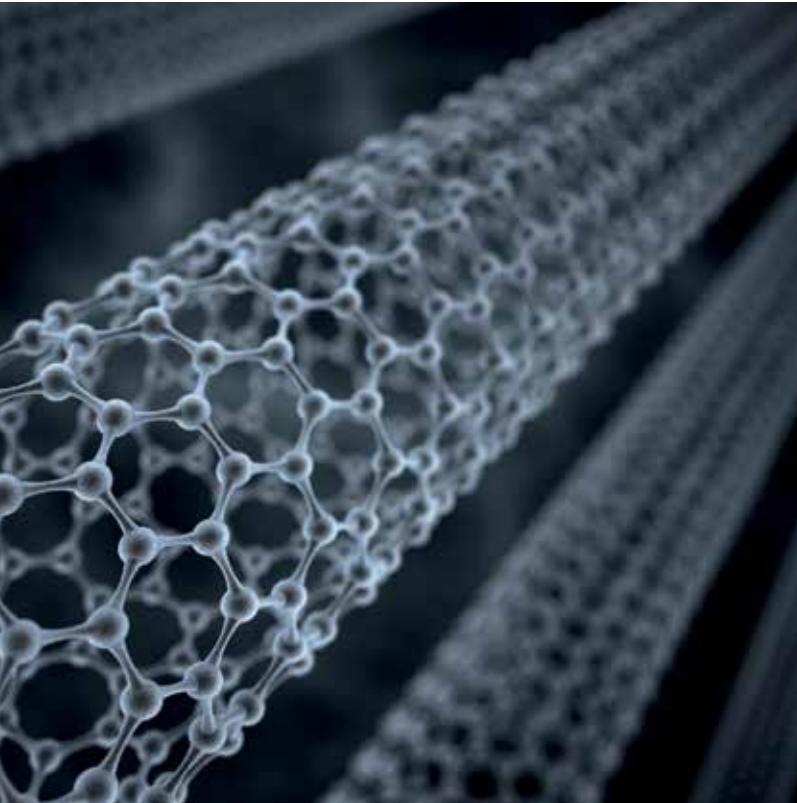




UNIVERSITY OF  
BIRMINGHAM

MATERIALS  
SCIENCE AND  
ENGINEERING



# MATERIALS SCIENCE AND ENGINEERING MSc

# Introduction to Materials Science and Engineering

New materials underpin development and progress across a wide variety of sectors. New technologies, from planes to batteries, from hip implants to electronic devices, are made possible, and often limited by, the materials we currently know and use. Materials Scientists and Engineers work hard to understand how and why materials behave the way they do, and exploit this knowledge to develop new materials with amazing properties.

Studying Materials Science and Engineering, you will develop a fundamental understanding of how the properties of a material, such as strength, electronic properties and biocompatibility, are affected by the material's structure, such as its crystal structure or microstructure.

This knowledge can then be used to formulate strategies to develop new materials, such as alloys able to operate at higher temperatures for jet engine blades or high-toughness ceramics for armour applications. This programme will equip you with the skills required to join a wide variety of industries in the capacity of materials specialist, or continue your education at a PhD level.

## WHY CHOOSE BIRMINGHAM?

- One of the best centres for materials research in the UK
- World-leading and unique facilities, such as the £60 million High-Temperature Research Centre
- Strong collaborations with a large number of industrial partners, including Rolls-Royce, Baosteel and many others
- Wide range of research activities, from the atomic scale to components



# Materials Science and Engineering

## MSc

Materials underpin almost all industrial sectors and the global challenges have increased the demand for new materials. Accordingly, there is a growing demand for materials engineers and researchers worldwide and in rapidly developing countries in particular. The School of Metallurgy and Materials has long been a centre of excellence in materials research and education, and our MSc programme has been designed to promote access to advanced research in this field.

### FACT FILE

**Start Date:** September/October

**Duration:** 1 year full-time or  
2 years part-time

**Fees for 2020/21:** UK/EU – £9,900  
full-time. International – £23,310 full-time

**Entry requirements:** 2:2 Honours  
degree in a relevant subject  
(eg, physics, chemistry, materials science,  
engineering, mathematics or any  
physical sciences subject)

### Course content

This course consists of 180 credits distributed over 12 months. Two thirds of the content (120 credits) consists of taught modules, which are delivered in Semester I and Semester II. One third of the content (60 credits) is the individual research project, which is carried out in Semester III and during the summer.

### Core modules

The core modules will ensure you will gain the adequate background to tackle most aspects of Materials Science and Engineering, and ensure you will develop key professional and research skills. You will learn the fundamentals of materials science, and how materials can be analysed and studied.

### Optional modules

The School offers a large number of optional modules, which will allow you to tailor your programme to your strengths and interests.

These modules, for example, will cover high-temperature alloys or self-sensing materials in great details.

### Individual research project

You will be given a choice to join one of our research groups to further develop your research skills and knowledge by doing an individual research project. This project will be self-contained and constitute a novel contribution to science and knowledge.

### Semester I

Core modules:

- Introduction to Materials
- Materials Characterisation
- Communication Skills

Optional modules (choose 4 or 5):

- Advanced Casting & Solidification
- Biomaterials
- Design Against Failure
- Electron Microscopy
- Functional Materials
- Polymer Science and Soft Matter
- Sensors and Composites
- Surface Engineering

### Semester II

Core modules:

- Effective Project Management

Optional modules (choose 4):

- Hydrogen and fuel cells
- Introduction to Modelling
- Materials for Energy Generation and Storage
- Materials for Sustainable Environment Technology
- Net Shape Manufacturing

- Physical Metallurgy for Titanium and Nickel

### Semester III and Summer

Example individual research projects:

- Additive Layer Manufacturing of Polymers
- Crack initiation and propagation in nuclear AGR graphite components
- Drug release from dental cements
- Plasma carburising of nanostructured austenitic stainless steels
- Effect of graphite-based materials on golf ball response

### CAREERS

### Employability and Careers

Our graduates go on to become engineers and scientists at a wide variety of industrial partners, or opt to continue their studies at PhD level.

Typical employers:

- BAE Systems
- Rolls-Royce
- Royal Air Force
- British Petroleum



### LEARN MORE

For full module information and an online application form, please visit our dedicated web pages, or contact us with your questions.

Tel: +44 (0) 121 414 5235

Email: [metmatpgrt@contacts.bham.ac.uk](mailto:metmatpgrt@contacts.bham.ac.uk)

### NEXT STEPS

For module information  
and to apply, visit:

[www.birmingham.ac.uk/msc-materials-science](http://www.birmingham.ac.uk/msc-materials-science)



- POSTGRADUATE ADVICE -

**ASK US A QUESTION**

'I chose the University of Birmingham as it is well known for Materials Science and Engineering. There are high-tech facilities available to students, including electron microscopes, which was why I chose to study here. The highlight of the course for me was the research project; after completing the 12 taught modules, I had a good idea of my area of interest. My supervisor was one of the most knowledgeable people in the field and I have met many people who were very helpful along the way. Completing my Masters has deepened my knowledge in fatigue crack, which has led me to the PhD project that I am currently undertaking.'

**YINGZI XI**, Material Science and Engineering MSc.

**ASK US A QUESTION:** [www.pg.bham.ac.uk/ask](http://www.pg.bham.ac.uk/ask)

This leaflet was written several months in advance of the start of the academic year. It is intended to provide prospective students with a general picture of the programmes and courses offered by the School. Please note that not all programmes or all courses are offered every year. Also, because our research is constantly exploring new areas and directions of study some courses may be discontinued and new ones offered in their place.

Please note the information in this brochure is correct at time of publication but may be subject to change (November 2019).

Designed and printed by

UNIVERSITY OF BIRMINGHAM | **creativemedia**



UNIVERSITY OF BIRMINGHAM

Edgbaston, Birmingham,  
B15 2TT, United Kingdom  
[www.birmingham.ac.uk](http://www.birmingham.ac.uk)