The University Of Sheffield.

Department Of Materials Science & Engineering

Course Information
Autumn 2018

MEng Materials Science and Engineering (Research)

UCAS Code: J505

This course covers all aspects of Materials Science and Engineering, including both the fundamental science behind the behaviour of materials, and how they are processed and used industrially.

There is a mix of lecture courses, practical work, tutorials and experience of projects, both in an academic and industrial setting. The latter years are particularly designed to prepare students for a career in research, either progressing to PhD or in an industrial setting.

Year 1

The first year of the course is intended to build the fundamental background knowledge required for all Materials Science and Engineering study. As such this year contains introductory courses across a broad range of key Materials topics.

Core Modules — **100/120 credits**

Courses introduce the chemistry of materials (how atoms arrange themselves in crystalline materials and how polymers are formed), microstructure, mechanical properties of materials and their use in structural applications, thermodynamics and energy and how these relate to materials, magnetic, electrical and optical properties, natural and replacement biomaterials, nanomaterials, the life cycle of materials and the key elements of mathematics. Specialist software available during the course and important digital skills are also covered.

Optional Modules — **20/120 credits**

There are also options choosing either specialist materials / biomaterials components, modern languages or management.

Other parts of the course

Lecture courses are supported by a program of practicals and tutorials. You will also participate in the week-long Global Engineering Challenge, working in multidisciplinary teams with other engineers to come up with solutions to sustainable development needs.

Year 2

In the second year the ideas from year 1 are developed further, with a number of courses that build directly on first year topics. Certain material classes are addressed separately, and processing and manufacturing considered.

Core Modules — **100/120 credits**

Topics explored further include the mechanical behaviour and deformation of materials, microstructure and thermodynamics, as well as underpinning mathematics.

New topics include functional materials (where they are used for electrical, magnetic or similar applications), formal methods for the selection of materials for different applications are presented, along with industrial materials processing from primary production to final component manufacture. Computer-based materials modelling and simulation is also covered.

Optional Modules — **20/120 credits**

There are opportunities to select topics on current materials research, further biomaterials or materials and energy (conventional, nuclear and renewable generation, batteries and storage), as well as further study of language or management.

Other parts of the course

Lecture courses are supported by a further program of practicals and tutorials. There is another week-long project with other engineers (Engineering: You're hired) where projects are provided by industry.

Note: the courses have a lot in common for the first 2 years. It is therefore possible to change to another degree in the Department at the end of year 2 (provided that a 60% average is achieved for MEng degrees).

Year 3

In year 3 there is an increased use of other types of teaching as compared to the traditional lectures. The intent here is to give high-level knowledge in major areas of materials science and technology. There is also a much increased array of optional modules to allow students on this course to begin to specialise.

Core Modules — 20/120 credits

The core modules in the 3rd year cover scientific writing skills (for reports, theses and scientific papers) and an introductory module on finance and law.

Optional Modules — 70/120 credits

Optional modules are designed to take the knowledge of specific areas of Materials to a high level. Options to choose from include advanced ceramics (especially for functional devices), Finite Element Modelling, diffusion and heat transfer, materials analysis methods, nuclear science and technology, composite materials, natural materials and medical biomaterials and engineering alloys.

Other parts of the course — 30/120 credits

Some significant other parts of the course allow a wider range of experience to be developed in this year.

Mini Guided Projects: Students will undertake of four mini-projects under the guidance of an academic tutor, crossing different areas of materials research to become skilled in the use of a wide range of techniques and knowledgeable about different materials. The degree of guidance provided will diminish through the module so that students' learning of the research process moves from being through tuition at first and to practice later.

Year 4

Core Modules — 10/120 credits

The final remaining core module addresses outreach to the general public, an important part of research. Students will design deliver and evaluate their own outreach projects.

Optional Modules — 30/120 credits

Optional modules are selected from materials modelling, glasses and cements, nuclear technology and waste management, metals processing, nanomaterials, composites and materials for energy.

Other parts of the course — 80/120 credits

Individual Research Project: A very large part of the final year is made up of the individual research project, which will be correspondingly more detailed in this course than in the other courses. Students will be able to select which area of research they wish to work in, and will have significant input into deciding the investigation goals. During this time they will be fully embedded in a research group, interacting with PhD students, researchers and academics.

The content of our courses is reviewed annually to make sure it's up-to-date and relevant. This is in response to discoveries through our world-leading research, funding changes, professional accreditation requirements, student or employer feedback, outcomes of reviews, and variations in staff or student numbers.

We aim to provide accurate and up-to-date information in all of our publications, but applicants should always refer to our website for the most up to date course information.

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