The University Of Sheffield.

Department Of Materials Science & Engineering

Course Information

2020 Entry

MEng Biomaterials Science and Engineering

UCAS Code: JH5P

This course covers the fundamentals of Materials Science and Engineering, and how these ideas can be applied to address the challenges of using materials in medicine and healthcare.

Year 1

The first year of the course is intended to build the fundamental background knowledge required for all Materials Science and Engineering study, with a particular focus on how materials interact with the body.

Core Modules **120 credits**

Courses introduce natural and replacement biomaterials, the basics of the biology and chemistry of living systems (in particular for cell and human biology), the structure and function of body tissues, and more general materials issues, such as 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, and the key elements of mathematics.

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.

Note: the courses have a lot in common for the first year. It is therefore possible to change to another degree in the Department at the end of year 1.

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 **120 credits**

Topics explored further include artificial biomaterials, the mechanical behaviour and deformation of materials, as well as underpinning mathematics. Human physiology is extended to look at the musculoskeletal system, the neural and endocrine systems in more detail, and there is more in depth study of the biology and chemistry of living systems.

New topics include cellular and molecular biology, the biomechanics and fluid mechanical descriptions of the human body, formal methods for the selection of materials for different applications, along with industrial materials processing from primary production to final component manufacture.

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.

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.

Core Modules **90/120 credits**

The main areas addressed in detail in the 3rd year are tissue engineering, materials used in biological applications, composite materials, engineering metals, surface degradation and protection. There is also training in performing Finite Element Modelling, and an introductory module on finance and law.

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.

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Research Seminars: students will attend and participate in a series of seminars given by invited academic and industrial speakers. As well as technical topics, these seminars will also address business and ethical issues.

Projects in Bioengineering: Students will follow through the process of developing a new idea for a research and development project, and plan the execution of the work, including project management, intellectual property, risk management and costing.

Year 4

Core Modules **25/120 credits**

The final remaining core modules address scientific writing skills and materials modelling approaches.

Optional Modules **45/120 credits**

Optional modules are selected from synthetic and natural bionanomaterials, functional and structural ceramics, glasses and cements, metals processing, nanomaterials and composites.

Other parts of the course **50/120 credits**

Individual Research Project: Students will have the opportunity to select project areas of interest from across the research of the department, and then spend the entire academic year working on the project with one of the research groups.

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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