IMPERIAL

Faculty of Engineering

Department of Bioengineering

BSc Medical Sciences with Biomedical Engineering

Programme Overview 2025-26

Contents

1.   Welcome from the Programme Director

Dear students,

Welcome to Bioengineering! I am delighted to be able to introduce you to the Department and to the intercalated BSc Medical Sciences with Biomedical Engineering programme. I hope to meet you in person in the future, as a student of this exciting programme, which is entering its seventh year for 2025-26 entry.

Bioengineering is a dynamic and growing discipline, which brings together engineering, medicine, life sciences and physical sciences. Our interdisciplinary research is ground-breaking and has had a demonstrable impact in healthcare and fundamental biomedicine. Find out more about our research in the next section of this guide or on our website.

We believe there is a great deal of benefit in introducing collaboration between medics and engineers at an early stage of the curriculum. You will gain a very different perspective on medicine and healthcare through developing your engineering knowledge; you will develop new learning techniques; you will build invaluable networks; and you will be well placed to contribute to the medical profession, whether through a conventional route or in one of the closely related industries.

The Department of Bioengineering is known for being welcoming, dynamic and lively. We take great care of our students and really value their contribution, both inside and outside the classroom. Our staff are dedicated to ensuring all our students have a challenging, interesting and supported experience, both academically and pastorally - so do make the most of their expertise throughout the programme.

Scientific medicine revolutionised the practice of medicine in the 20th century; engineering is already revolutionising 21st century medicine. Exploitation of the astonishing developments in robotics, biomechanics, sensing, imaging, neuroscience, biomaterials, regenerative medicine, synthetic biology, and artificial intelligence will require a new way of working.

Our new intercalated programme will equip you with a solid foundation in the engineering underpinning of modern medicine, provide collaborative research opportunities at the cutting edge, enable long-term collaboration and new career opportunities. This will stand you in excellent stead to contribute to the cutting-edge of healthcare innovation in the future.
We hope that you will be excited by this opportunity and will enjoy your time in the department. If you have any queries about the programme or would like to find out more, please do get in touch with us.

With very best wishes,
Nic
Programme Director

n.newell09@imperial.ac.uk
https://profiles.imperial.ac.uk/n.newell09

2.   Introduction to the Department of Bioengineering

What is Bioengineering?

Biomedical engineering is a discipline that advances knowledge in engineering, biology and medicine, and improves human health through cross-disciplinary activities that integrate the engineering sciences with the biomedical sciences and clinical practice. It includes:

▪ The acquisition of new knowledge and understanding of living systems through the innovative and substantive application of experimental and analytical techniques based on the engineering sciences.

▪ The development of new devices, algorithms, processes and systems that advance biology and medicine and improve medical practice and health care delivery.

What is Bioengineering?

About the Department

The Department of Bioengineering at Imperial College London is leading the bioengineering agenda both nationally and internationally, advancing the frontiers of our knowledge in the discipline's three main areas:

a. Biomedical engineering:

Developing devices, techniques and interventions for human health.

b. Molecular bioengineering:

Solving problems related to the life sciences and their applications for health.

c. Biomimetics:

Using the structures and functions of living organisms as models for the design and engineering of materials and machines.

Research

Our research is highly interdisciplinary and involves extensive collaborations with departments from all faculties in the College and leading London hospitals, as well as international universities and research centres.

Because of its cross-disciplinary nature, the research is best reflected in terms of themes:

▪ Biomechanics and Mechanobiology

▪ Biomedical Sensing, Diagnostics and Imaging

▪ Computational and Theoretical Modelling

▪ Medical Devices

▪ Molecular and Cellular Bioengineering

▪ Neurotechnology and Robotics

▪ Regenerative Medicine and Biomaterials

Studying

Bioengineering's potential to improve tomorrow's world has made it one of the fastest growing fields in science and engineering, and number one for job growth prospects. The Department of Bioengineering offers opportunities to study at both undergraduate and postgraduate levels. We are committed to the highest quality teaching and learning, and to our students' Imperial experience both inside and outside of the lecture theatre.

Industrial links and careers

The Department of Bioengineering works with industry partners from start-up companies to global corporations in the UK and internationally in a wide range of projects. Our work with partners includes:

▪ **Research Collaborations**. Working with industry partners on the development of new biomedical and bioengineering technologies.

- **Student projects, placements and internships** in the UK and internationally

- **Events and training**

- **Translation of new science into applications** and products which impact on wider society.

- **Consultancy work** to help companies solve engineering and science problems

Pastoral care

We want you to be happy and successful during your time in the Department. We are renowned for being a friendly and welcoming Department so if you do have problems or want to talk to someone please do come and see us. If we can't help with your problem then we will help you find someone who is able to help you.

Personal Tutors

Your Personal Tutor is usually a member of academic staff who is allocated to you for the duration of your course to offer help and support with academic or personal issues. They will also follow your progress throughout the course to help keep you on track to succeed.

Senior Tutor

The Department's Senior Tutor (Dr Faraz Janan) has overall responsibility for the academic and pastoral care of undergraduate students in the Department. If for any reason you are not comfortable speaking to your Personal Tutor you can arrange to speak with the Senior Tutor instead.

Academic Tutor

The Department's Academic Tutor (Mr Martin Holloway) assists with the administration of programmes, provides academic support to students, delivers teaching and lectures, and provides invaluable pastoral support.

Student Office

The Student Office is located in Bessemer 314. Our role is to support all the teaching activities of the Department – that includes helping students and academics with a range of queries on a number of topics, such as:

- Student admissions

- Administration of UG, PGT, and PGR programmes

- Administration for exchange and visit students

- Examinations

- Timetabling

- Delivery of programmes

Page 6 of 16

- Coursework and assessment deadlines

- Administration of the Department Teaching Committee and Staff-Student Committee

- Student feedback

- Teaching policies and procedures

- Quality assurance

- Implementation of new degree programmes

Typically, your first port of call for most queries would be either your Personal Tutor or the Student Office. We are here to help you so please do pop in if you have any queries. We also love to hear your suggestions on how to improve things – such suggestions can be made formally through the student reps and Student-Staff Committee, or informally by dropping in and having a chat.

3. Provisional dates for the academic year 2025-26

Term dates

Autumn term:	26 September 2026 - 11 December 2026
Spring term:	2 January 2027 - 19 March 2027
Summer term:	24 April 2027 – 4 June 2027

Closures dates

Christmas 2026/New Year 2027
The university closes at your usual finishing time on Wednesday, 23 December 2026

Thursday 24 December - closure day (3)

Friday 25 December - Christmas Day

Saturday 26 December - Boxing Day

Monday 28 December (Substitute Bank Holiday in lieu of 26 December)

Tuesday 29 December - closure day (4)

Wednesday 30 December - closure day (5)

Thursday 31 December - closure day (6)

Friday 1 January - New Year's Day

The university re-opens Monday, 4 January 2027

Easter
The university closes at your usual finishing time on Wednesday 1 April 2026

Thursday 2 April- closure day (1)

Friday 3 April – Good Friday

Monday 6 April - Easter Monday

Tuesday 7 April - closure day (2)

The university re-opens Wednesday 8 April 2026

Early May Bank Holiday
Monday 4 May

Spring Bank Holiday
Monday 25 May

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4. Key contacts

For your year of study on the BSc Medical Sciences with Biomedical Engineering programme, you will be part of our community. We hope all students, regardless of programme, will actively engage with the Department and contribute to Departmental activities such as seminars, public engagement, and outreach activities.

As such, you will get to know many members of staff, but below are some of the key people who will be able to help you if you have any queries or difficulties.

Professor Rylie Green

Head of Department

PA: Ms Angela Glyes

a.glyes@imperial.ac.uk

Dr Spyros Masouros

Director of Teaching;
Director of Undergraduate Studies

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Dr Faraz Janan

Senior Tutor

f.janan@imperial.ac.uk

Dr Maria Parkes

iBSc Pre-sessional course leader and MEng Biomedical Engineering Programme Director

maria.parkes04@imperial.ac.uk

Dr Nic Newell

Director of Intercalated BSc Medical Sciences with Biomedical Engineering

n.newell09@imperial.ac.uk

Ms Julie Hoang

Learning Technologist

j.hoang@imperial.ac.uk

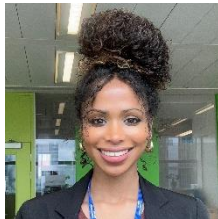Mr Martin Holloway

Academic Tutor

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Ms Geethma Aponsu

Student Wellbeing Adviser

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Ms Nicola Guirguis

Head of Student Programmes

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Ms Mary Ewumi

Senior Student Administrator
(Admissions)

be.ugadmissions@imperial.ac.uk

Ms Nicole Harbert

Teaching Operations Manager

n.harbert@imperial.ac.uk

Mr Robert Ferguson

Industrial Liaison Manager

+44 (0)20 7594 6371

robert.ferguson@imperial.ac.uk

Technical staff

Mr Ken Keating

Technical Operations
Manager & Departmental
Safety Officer

+44 (0)20 75945170

+44 (0)7590 250478

k.keating@imperial.ac.uk

Please click here to meet our Student Support and Technical teams:
https://www.imperial.ac.uk/bioengineering/people/professional-services-technical-and-operations-staff/

5. Programme Overview

Introduction

This programme will provide you with an education in engineering as applied to healthcare challenges, and position you well for interdisciplinary careers at the forefront of healthcare innovation.

Content

The programme is delivered across three terms, and will comprise online pre-sessional learning, core modules, elective modules and a group research project. You will be able to specialise by choosing some elective modules to suit their individual interests. Throughout the year, collaboration with other bioengineering students is encouraged - specifically in the group research project, where medics and bioengineers work together to produce original research relating to real-world challenges.

The programme will begin with a course of pre-sessional learning to build up your skills in mathematics and programming to enable you to engage with the engineering content of the programme. In the autumn term, you will study several core modules including a bespoke double module 'Fundamentals of Biomedical Engineering', to ensure you develop a deep understanding of core concepts. In the autumn and spring terms you will be able to specialise in areas of interest through elective module choices. You will also engage in substantial original research in collaboration with bioengineers through a group research project taking place throughout the academic year. The programme will culminate with final examinations, submission of remaining coursework and group project presentations.

Pre-sessional Learning

To ensure that you have the required mathematics and programming knowledge, you will be expected to undertake some compulsory guided study before commencing the programme. This is important because although many of you will be able mathematicians, you may not have used these skills for some time, and will need to be apply to apply them in an engineering context from the beginning of the degree programme. You may or may not have experience with programming; the pre-sessional learning will introduce computational thinking and simple programming, which will help you a great deal with the rest of the programme. Note that the pre-sessional learning is taught entirely through the College's online learning environment (Blackboard) and so access to the internet is essential for completing the presessional learning. You will have access to experienced members of staff who will support your learning and assist with any queries, either via live tutorials or via booked personal eappointments. Your engagement and progress on the pre-sessional module will be monitored to ensure appropriate support is provided. The pre-sessional learning programme will be delivered over six weeks, during August and September before the programme starts, though the material is normally made available from the start of August. There will be approximately 5 hours of guided learning per week. You will also be able to access videos of lectures and demonstrations, regular formative online quizzes to

enable self-assessment, and self-directed learning opportunities. Therefore in total is expected that you will complete around 30 hours total of guided study, and it is expected that you will also dedicate adequate additional independent study time to ensure you are confident with the material prior to the start of term. The amount of independent study required will depend on your background and aptitude for mathematics and programming. The pre-sessional training will not contribute to final degree grades but individual feedback will be provided following diagnostic tests early in the academic year and used to identify potential gaps in knowledge which may need to be addressed.

Programme Structure

This intercalated programme runs over three terms, for one academic year. The number of hours of learning and teaching, and hours of independent study vary from module to module. Students are also expected to undertake pre-sessional learning for approximately six weeks prior to the start of the course, to ensure they have the required background knowledge and skills to enable them to make good progress on the intercalated programme.

Period	Modules
August - September 2026	Online pre-sessional learning
Autumn Term 26 Sep 2025 - 11 Dec 2025 **Spring Term** 2 Jan 2027 - 19 Mar 2027	▪ Fundamentals of Biomedical Engineering ▪ Probability and Statistics for Bioengineering ▪ Journal Club ▪ Group Research Project ▪ Students choose 3 or 4 electives modules
Summer Term 24 Apr 2027 - 4 Jun 2027	▪ Group Research Project

*Note that not all combinations of elective modules may be possible due to timetabling constraints, and electives have to be chosen within guidelines.

Entry requirements

The programme is available to medical students both from Imperial College London and from

other institutions. Students are required to be registered on a General Medical Council (GMC) recognised MBBS degree (or equivalent). Students must have successfully completed the first two

years of that programme. No break in studies is permitted between the programme at the other institution and the beginning of the programme for the BSc degree. Intercalating students need to demonstrate that they are likely to receive a 2.1 or 1st by supplying an academic transcript from their home institution. It is expected that applicants received at least a 2.1 in their second year of study

All applicants will normally be required to have achieved a minimum of Grade 'B' at A Level in Mathematics, or equivalent

Additional information

This document provides a brief overview of the intercalated programme. For further details, it is important that when you join the programme, you ensure you read (in full) the programme handbook, the programme regulations and any relevant Departmental or College policies and procedures.

6.   Assessment

Examinations and coursework
Each module will be assessed through coursework, practical work, or written exams; or a combination of some or all of these. The main examination periods in the Department are December/January and May/June.

Coursework deadlines within the Department are monitored to ensure that you do not have an unreasonable workload at any one time.

Rules of progression
To successfully pass the programme, a student must:

▪ Achieve an overall aggregate mark of at least 40%

▪ Achieve a pass in the mastery assessment for relevant modules

▪ Achieve a mark of at least 40% in each module (50% for electives at Level 7)

Final degree classifications:
▪ First – a student must achieve an aggregate mark of 70%

▪ Upper second – a student must achieve an aggregate mark of 60%

▪ Lower second – a student must achieve an aggregate mark of 50%

▪ Third – a student must achieve an aggregate mark of 40%

7.   Overview of modules

From time-to-time unfortunate events can happen and so it is important that you are familiar with these procedures, so that you know who to contact and what to do in case of an emergency or serious problem.

Pre-sessional learning: mathematics and programming (core)
This pre-sessional study module is designed to build students' confidence and abilities in core mathematical concepts and programming to prepare for the formally assessed modules. The content is designed to: (i) revise those aspects of A-level (or equivalent) mathematics that will be built upon in mechanics and electrical engineering and to (ii) provide an introduction to computational thinking and simple programming.

Fundamentals of biomedical engineering (core)
In this module you will cover the basic principles of mathematics, computational thinking, electrical engineering, mechanical engineering and physics required to allow you to successfully complete the technical modules on your Bioengineering programme.

Probability and Statistics for Bioengineering (core)
The aim of this module is to provide a solid foundation in statistics and data analysis, to give you the knowledge and skills required for analysing and presenting data. During the module you will be introduced to the concepts that underly statistical models, and will develop an understanding of how to apply these models to real data using MATLAB. At the end of the module, you should have the confidence to carry out the most common statistical analyses, or to build upon your knowledge to utilise more specialised approaches.

Journal club (core)

In this module you will read and discuss key journal articles relevant to the course. You will relate your reading and research to the group projects which you will undertake as part of the course, e.g. exploring clinical aspects of your group project through a literature review, prior to working on developing an engineering solution to the problem.

By the end of the course, students will be able to:

▪ Read journal articles and extract the important information
▪ Write a critical review (referee report) on the article
▪ Understand the structure and writing style of high impact journal articles

Each week, students will read and review relevant journal articles individually. During the scheduled sessions, students will be required to take turns to present a summary and critique of specific papers to the rest of their group, which will be followed by a question and discussion session. Students will also take turns writing a critical review of the papers discussed each week, to be submitted the following week. All students should engage with the discussion of papers regardless of if it is their turn to present or write a critical review.

Group research project (core)

Students will work on a research project in teams of about 5 to 8 students. These projects can take a variety of forms, and may focus on design, computational work, bench work, extended literature reviews, or building props used for teaching or outreach. Project work starts from the second week of Autumn term, and finishes at the end of Summer Term. Throughout the year, you are expected to work on the project for about 1.5 days (12h) per week (there are no specific dedicated days, as schedules will differ across students depending on their module choices); Autumn and Spring term reading week should largely be dedicated to project work and are followed by intermediate assessments. Project work will be full-time after summer exams. In total, you should spend about 40-60 days full time equivalent on the project, reflecting the contribution to the final year mark (33%).

Elective modules

Please note all electives modules are subject to change for the 2025-26 academic year. Students should also note that rules will apply to module selection which must be adhered to. Students study all core and compulsory modules. Students then choose 4 electives from Groups A and B, where no more than 1 elective can be from Group B. Students should note that the pass mark for electives at Level 7 is 50%. Elective modules: choose four (8.3% each)

Group A (FHEQ Level 6)

Advanced physiological monitoring and data analysis (elective)

In this module, you will focus on three core aspects of biological and clinical measurement:

- Data handling and fitness for purpose
- Chemical measurement in cells and in vivo including how we use sensors, biosensors, electrochemical sensors, Bioassays and other detection methods
- Challenges of non-invasive chemical monitoring of human tissue (Blood, urine, sweat) and approaches to invasive monitoring of tissue (Microdialysis, implanted sensors and Biosensors)

Principles of Biomedical Imaging (elective)

This module will explain how images of the human body can be obtained using different forms of penetrating radiation. It will also provide a detailed explanation of how the imaging modalities of CT, X-ray, MR, US and optical imaging work.

Image processing (elective)

This module will provide students with a substantial introduction to digital image processing relevant to image analysis. It will also provide students with appreciation of aspects of computation in interpreting or "parsing" images, as well as introducing students to some of the biomedical, clinical and research applications of image processing and computer vision.

Orthopaedic biomechanics (elective)

The objectives of this course are to understand the basic mechanics of the musculoskeletal system. The course will cover the structure and function of the musculoskeletal tissues (bone, cartilage, muscle, tendon, ligament), the mechanics of the tissue (or tissue's response to mechanics), diseases and injury of the tissues, and clinical treatments.

Neuroscience (elective)

The aim of the course is to introduce students to the key principles and methods of neuroscience, covering multiple levels of organisation, from molecules to behaviour.

Tissue engineering and regenerative medicine (elective)

This module will introduce fundamental concepts of normal tissue development, then discuss how researchers have used this information to imitate nature in a lab setting, engineering cells and tissues that may be used to model diseases, treat disease, or develop drugs.

Bioengineering Approaches to Cancer (elective)

This module will provide students with an understanding of the fundamental biological and biophysical processes involved in cancer and the application of bioengineering to better understand and manage the disease.

Cellular and Molecular Mechanotransduction (elective)

Topics include: Introduction to Mechanobiology; The cytoskeleton in cells; Main molecular signalling pathways involved in cell biomechanics; Subcellular structures and molecules relevant to mechanobiology; Mechanosensing, mechanotransduction, and mechanosignalling; Techniques for mechanical manipulation of cells; Mechanotransduction across different length scales; Cellular mechanotransduction; Molecular mechanotransduction; Mechanotransduction in health and disease; Biomechanics of stem cells; Biomechanics of pancreatic cancer; Biomechanics of liver cancer; Biomechanics of breast cancer.

Biomedical Instrumentation (elective)

To develop and shape the students' ability to translate a set of bioengineering/biomedical specifications into a practical and robust instrumentation architecture.

Ionising Tissue and Flow Imaging (elective)

This module explains the basic physics of nuclear medicine and its practical application to nuclear medicine.

Group B (FHEQ Level 7)

Medical device entrepreneurship (elective)

Gain insight into the process and challenges involved in the development of new products in the medical sector. Analyse case studies and hear guest presentations from startups, investment firms and entrepreneurs and learn from their experiences in bringing medical devices to market.

Medical device certification (elective)

This course is aimed at teaching key information and skills needed by professional engineers in the development of medical systems and devices; specifically in the preparation of a project for CE certification (or regulatory approval in the appropriate environment)

It has two components:

▪ Product Development for medical devices
▪ Safety, hazards and safe working practices

Biomimetics (elective)

Discover the new interdisciplinary field of biomimetics, which explores how functional principles found in nature can inspire scientists and engineers to solve outstanding technological problems.

8.   Useful links

Website

Faculty of Medicine Intercalated BSc programme website:

https://www.imperial.ac.uk/medicine/study/undergraduate/intercalated-bsc-programme/biomedical-engineering/

Department of Bioengineering website:

https://www.imperial.ac.uk/bioengineering/

You must inform your Senior Undergraduate Tutor if you are absent from the university for more than three days during term. If the absence is due to illness, you must produce a medical certificate after seven consecutive days. If you miss an examination or the deadline for any other assessment (including lab work, in class tests and all forms of coursework or presentation) due to illness or other unforeseeable and unavoidable circumstance you must follow the Mitigating Circumstances Policy and Procedure. Please note all claims

Other useful information and support services

You must inform your Senior Undergraduate Tutor if you are absent from the university for more than three days during term. If the absence is due to illness, you must produce a medical certificate after seven consecutive days. If you miss an examination or the deadline for any other assessment (including lab work, in class tests and all forms of coursework or presentation) due to illness or other unforeseeable and unavoidable circumstance you must follow the Mitigating Circumstances Policy and Procedure. Please note all claims

Registry

https://www.imperial.ac.uk/admin-services/registry/

Careers service

https://www.imperial.ac.uk/careers

Accommodation

https://www.imperial.ac.uk/students/accommodation/

Student Finance

https://www.imperial.ac.uk/students/fees-and-funding/

ICT Service

https://www.imperial.ac.uk/students/online-services/

Sport Imperial

https://www.imperial.ac.uk/sport/

Student Records and Data

https://www.imperial.ac.uk/student-records-and-data

Alumni Services

https://www.imperial.ac.uk/alumni/