

Programme Information		
Programme Title	Programme Code	HECoS Code
MSc in Engineering for Biomedicine	HB90	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 Calendar Year (12 months)	Full-Time	Annually in October	90	180

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Bioengineering
Associateship	None	Main Location(s) of Study	South Kensington Campus
External Reference			
Relevant <a href="#">QAA Benchmark Statement(s)</a> and/or other external reference points		Master's Award in Engineering	
<a href="#">FHEQ Level</a>		Level 7 - Master's	
<a href="#">EHEA Level</a>		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A
Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A
Specification Details			
Programme Lead	Dr Chiu Fan Lee		
Student cohorts covered by specification	2021-22 entry		
Date of introduction of programme	October 20		
Date of programme specification/revision	October 21		

## Programme Overview

Bioengineering is at the interface of engineering and medicine. Indeed, bioengineering 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.

The MSc in Engineering for Biomedicine is a one-year full-time programme leading to the MSc award. Students of the programme will benefit from interaction with students on other programmes in the Department to develop their interdisciplinary knowledge.

The programme involves lectures and practical work in the first two terms, followed by full-time work on a research project. A variety of seminars and workshops are provided to deepen and broaden the students' research skill base. The programme will prepare students to analyse and solve problems in bioengineering using an integrated, multidisciplinary approach.

In the core modules, you will learn the basics of engineering maths, biomedical imaging, programming skills, statistical and data analysis tools, medical device certification, and how to critically assess relevant scientific literature. There will also be an ethics component and you will be guided through an ethical analysis on the implications of potential medical devices. Through elective modules, you will have the option to learn about a diverse range of topics relevant to regenerative medicine, diagnosis and treatment of disease, orthopaedics and synthetic biology.

## Learning Outcomes

**Upon successful completion of the programme you will be able to:**

- Apply core and specialised concepts in engineering to medicine and to the life sciences
- Critically analyse and solve problems creatively in bioengineering using an integrated multidisciplinary approach
- Create, plan, conduct and write-up a programme of original research in bioengineering and life sciences
- Formulate and test hypotheses using appropriate design of models or experiments, as well as statistical analysis of data
- Critically analyse results, determine their strength and validity, and make recommendations
- Use laboratory methods or computer-based tools to generate data relevant to the bioengineering problems at hand
- Produce technical reports and give technical presentations
- Communicate effectively and clearly across different scientific disciplines through oral presentations, computer processing and presentations, and written reports
- Transfer techniques and solutions from one discipline to another
- Approach problems systematically and independently with the ability to reflect and adapt, and for the purpose of continuing professional development.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: [www.imperial.ac.uk/students/academic-support/graduate-attributes](http://www.imperial.ac.uk/students/academic-support/graduate-attributes)

## Entry Requirements

Academic Requirement

The minimum requirement is normally a 2.1 UK Bachelor's degree with Honours in a clinical or life science degree (or a comparable qualification recognised by the College)

Applicants awarded an unclassified clinical degree (e.g MBBS, MBChB and MChD/BChD) are expected to show good academic standing

	(typically within the top 50% of their medical school cohort). Where a graded intercalated degree has been undertaken at least a 2.1 should have been achieved.  An 'A' grade in A-level maths desirable
Non-academic Requirements	N/A
English Language Requirement	<a href="#">Standard requirement (PG)</a> Please check for other <a href="#">Accepted English Qualifications</a>
Admissions Test/Interview	N/A

The programme's competency standards documents can be found at:  
[www.imperial.ac.uk/media/imperial-college/faculty-of-engineering/bioengineering/public/student/Competency-Standards---Bioengineering-UG-PG---June-2016-Final.pdf](http://www.imperial.ac.uk/media/imperial-college/faculty-of-engineering/bioengineering/public/student/Competency-Standards---Bioengineering-UG-PG---June-2016-Final.pdf)

## Learning & Teaching Approach

### Learning and Teaching Delivery Methods

You will be taught through a combination of lectures, seminars, tutorials, journal clubs, and practical classes. Tutorial sessions typically involve solving problems by applying what you have learned from the lectures. Practical experimental and/or computational skills will be developed through laboratory demonstrations and/or computing labs. Research skills will be developed through individual project work.

In addition, transferable skills will be acquired through coursework, journal club, presentations, and individual project work.

### Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. While your actual contact hours may vary according to the optional modules you choose to study, the following gives an indication of how much time you will need to allocate to different activities at each level of the programme. At Imperial, each [ECTS credit](#) taken equates to an expected total study time of 25 hours. Therefore, the expected total study time is 2,250 hours per year.

For a typical 5 ECTS module, it is expected that 27 hours would be spent in lecture and/or tutorials/labs, and 98 hours in independent study. For the project, we expect that students spend 100 hours in training, meetings and other research group related activities, and 900 hours engaged in independent study and research.

## Assessment Strategy

### Assessment Methods

To support and assess the students' learning, this programme will employ both summative and formative assessments. The goal of the summative assessment is to assess the students' summative achievements for purposes of degree classification, which includes forms of written exams, coursework, etc. The formative assessment is designed to support you to better perform in your summative assessment to meet the learning outcomes of the programme

Specifically, the assessments include:

#### Written Exams

- Short questions/essays/multiple choice

#### Coursework

- Written reports
- Laboratory write-ups
- Risk analyses and Technical Files
- Paper/grant review commentary
- Marked problem sheets
- Grant writing exercises
- Lab book completion

- Mastery assessments

Online:

- Multiple choice progression tests
- Quizzes

Oral:

- Individual presentations to small seminar groups
- Group presentations

Other:

- Laboratory practical exercises

The balance between assessment types will depend on the electives chosen.

#### Academic Feedback Policy

Feedback will be provided on coursework within two weeks of submission. Feedback may be provided in one of a number of formats, including:

- Oral (during or after lectures)
- Personal (discussion with academics during office hours)
- Interactive (problem solving tutorials with GTAs & study groups)
- Written (solutions/model answers to coursework)

Feedback will not be provided on written examinations.

Preliminary results will be provided to students as alpha-grades. Numerical results will be published after the meeting of the final Board of Examiners.

The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at:

[www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/](http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/)

#### Re-sit Policy

The College's Policy on Re-sits is available at: [www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/](http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/)

Eligibility for resits is determined by the Examination Board in line with the College policy. The Department of Bioengineering does not normally offer resits in September. Students with marginal failure may be offered a supplementary qualifying test in place of a re-sit opportunity.

#### Mitigating Circumstances Policy

The College's Policy on mitigating circumstances makes provision for Boards of Examiners to use their discretion where extenuating circumstances are independently corroborated and are judged by the advisory panel to be of sufficient severity to have substantially affected a student's performance.

The College's Policy on Mitigating Circumstances is available at: [www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/](http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/)

#### Additional Programme Costs

This section should outline any additional costs relevant to this programme which are not included in students' tuition fees.

Description	Mandatory/Optional	Approximate cost
N/A	N/A	N/A

Programme Structure <sup>1</sup>					
<p><b>Year 1 – FHEQ Level 7</b>  <b>Students study all core modules.</b>  <b>Students choose 4 electives, including 0 or 1 elective from Group A (Autumn term modules), and between 3 and 4 from Group B.</b></p> <p><b>Group A modules run in Autumn term, as do the core modules, and therefore students would be overloaded if they took more than 1 elective from Group A (Autumn term).</b></p>					
Code	Module Title	Core/ Elective	Group*	Term	Credits
BIOE96057	Fundamentals of Biomedical Engineering	Core		1	10
BIOE97142	Computational and Statistical Methods for Research	Core		1	5
BIOE97056	Principles of Biomedical Imaging	Core		1	5
BIOE97032	Medical Device Certification	Core		1	5
BIOE97031	Journal club	Core		1	5
BIOE97053	MSc Biomedical Engineering Individual Project	Core		1–3	40
BIOE97034	Advanced physiological monitoring	Elective	A	1	5
BIOE96071	Biomaterials for Bioengineers	Elective	A	1	5
BIOE97042	Medical device entrepreneurship	Elective	A	1	5
BIOE97047	Biomimetics	Elective	A	1	5
BIOE97179	Advanced Biomaterials and tissue engineering	Elective	A	1	5
BIOE97036	Orthopaedic Biomechanics	Elective	B	2	5
BIOE97061	Tissue engineering and regenerative medicine	Elective	B	2	5
BIOE97118	Bioengineering Approaches to Cancer	Elective	B	2	5
BIOE97172	Industrial Applications of Cellular Engineering L7	Elective	B	2	5
BIOE97126	Cellular and Molecular Mechanotransduction	Elective	B	2	5
Credit Total					90

\* 'Group' refers to module grouping (e.g. a group of electives from which one/two module(s) must be chosen).

<sup>1</sup> **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

## Progression and Classification

The three programme components are: 1) Core modules, 2) Elective modules and 3) the Research Project.

### **Pass**

A student must:

- Achieve an aggregate mark of at least 50% in each of the three programme components.

### **Merit**

A student must:

- Achieve an aggregate mark of at least 60% in each of the three programme components.
- At the discretion of the board of examiners achieve an aggregate mark of at least 60% in any two programme components and an aggregate mark of at least 50% in the remaining programme component.

### **Distinction**

A student must:

- Achieve an aggregate mark of at least 70% in each of the three programme components.
- At the discretion of the board of examiners achieve an aggregate mark of at least 70% in any two programme components and an aggregate mark of at least 60% in the remaining programme component.

## Programme Specific Regulations

None

## Supporting Information

The Programme Handbook is available at: **TBD**

The Module Handbook is available at: **TBD**

The College's entry requirements for postgraduate programmes can be found at:  
[www.imperial.ac.uk/study/pg/apply/requirements](http://www.imperial.ac.uk/study/pg/apply/requirements)

The College's Quality & Enhancement Framework is available at:  
[www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance](http://www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance)

The College's Academic and Examination Regulations can be found at:  
[www.imperial.ac.uk/about/governance/academic-governance/regulations](http://www.imperial.ac.uk/about/governance/academic-governance/regulations)

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[www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/](http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/)

Imperial College London is regulated by the Office for Students (OfS)  
[www.officeforstudents.org.uk/advice-and-guidance/the-register/](http://www.officeforstudents.org.uk/advice-and-guidance/the-register/)

**This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.**

## Modifications

Description	Approved	Date	Paper Reference
N/A	N/A	N/A	N/A

**Important notice:** The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.