

MEng Biomedical Engineering

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 intended as a reference point for prospective students, current students, external examiners and academic and support staff involved in delivering the programme and enabling student development and achievement.

Programme Information				
Award(s)	MEng			
Programme Title	Biomedical Engineering			
Programme code	BH9C			
Awarding Institution	Imperial College London			
Teaching Institution	Imperial College London			
Faculty	Faculty of Engineering			
Department	Department of Bioengineering			
Associateship	City and Guilds of London Institute (ACGI)			
Mode and Period of Study	4 academic years full-time			
Cohort Entry Points	Annually in October			
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's awards in Engineering UK-SPEC			
Total Credits	ECTS	240	CATS:	480
FHEQ Level	Level 7			
EHEA Level	2 nd cycle			
External Accrator(s)	Institution of Engineering and Technology (IET) Institution of Mechanical Engineers (IMechE) Institute of Materials, Minerals and Mining (IOM3) Institute of Physics and Engineering in Medicine (IPEM)			
Specification Details				
Student cohorts covered by specification	2016/17 entry			
Person responsible for the specification	Professor Martyn Boutelle			

Date of introduction of programme	October 2002
Date of programme specification/revision	August 2016
Description of Programme Contents	
<p>Students are admitted with high grades in three to five STEM subjects. The first year is designed to ensure that all students achieve a common breadth and depth of knowledge in Mathematics, Physics, Chemistry, Biology and Medical Science. The second year builds upon the first year to provide a platform for specialisation.</p> <p>Practical skills (that complement technical modules) are gained in the first two years in the context of wet and dry laboratories. Design, test and build activities start in the first year, and group working is introduced in fresher's week, as collaboration in interdisciplinary teams is a key feature of working as a professional Biomedical Engineer. The second year includes a substantial group project. Broader issues such as Ethics are also covered.</p> <p>In the first two years all modules are compulsory and are delivered in the department. Thereafter students may elect to take some modules in other departments of the Faculty of Engineering. Our students attend the same lectures and take the same assessments as the senior year students in the hosting department. This confirms that the first two years have provided a solid platform for specialisation. The knowledge, understanding and skills acquired throughout the Faculty will be translated into a Bioengineering themed final year individual project.</p> <p>After two years of compulsory courses (taught in-house) progression on to the third year of the MEng course requires an overall mark of at least 60%. The Director of Courses has the discretion to condone a near miss to this requirement. Otherwise, students are obliged to move to the third year of the BEng programme. The MEng programme has three pathways: Electrical Engineering, Mechanical Engineering and Bioengineering. The pathway choice determines the modules that are compulsory and a set of optional modules. However, there is still scope to take optional modules outside the pathway.</p> <p>Students entering the final year have no courses that are compulsory, but can choose all of their courses. This allows them to follow the topics that may have caught their interest, or for them to keep their options open. Much of the final year is spent on their individual project, and this is reflected in the mark weighting of the project.</p>	
Learning Outcomes	
<p>The programme has been designed so that graduates will be able to demonstrate the following UK-SPEC general learning outcomes:</p> <p>Knowledge and Understanding:</p> <ul style="list-style-type: none"> • The underlying scientific principles, engineering mathematics and computational tools that underpin Biomedical Engineering. • The core concepts, principles and theories of Electrical Engineering, Mechanical Engineering, Materials Engineering deployed in a Biological and Medical context. • Innovative and creative engineering solutions applied to healthcare problems and quality-of-life issues. • Moral and ethical issues (including professional conduct) and the role of the Professional Engineering Institutes. 	

Intellectual Abilities:

- The application of engineering principles to the analysis and design of Biomedical applications.
- The application of functional decomposition to manage the development of large scale complex systems.
- Critical evaluation of information gathered from academic and technical resources.

Practical Skills:

- Develop graduate attributes including global challenges, business and economics, humanities.
- Plan and safely execute experiments in diverse types of laboratories.

General Transferable Skills:

- Build team working and communication skills.

Additionally, MEng graduates will be able to demonstrate:

- Greater depth and breadth of knowledge and understanding of engineering applied to healthcare problems and quality-of-life issues.
- Additional application of knowledge and understanding in individual and group project work.

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

Entry Requirements

Academic Requirement	Minimum A*AA overall (or equivalent) to include A* in Mathematics, A in Physics and an A in Further Mathematics or Chemistry or Biology.
Non-academic Requirements	None

Applicants may be invited to attend an interview with one or more members of academic staff.

English Language Requirement	Standard Requirement: IELTS 6.5 with a minimum of 6.0 in each element or equivalent
------------------------------	---

The programme's competency standards document can be found at:

<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 Strategy

Scheduled Learning & Teaching Methods	<ul style="list-style-type: none"> • Lectures. • Tutorials and Study groups. • Dry laboratories in Electrical Engineering; Mechanical Engineering, Microcontrollers workshop, Computing, Mathematics, and Wet laboratories to handle Biological and Chemical materials.
---------------------------------------	--

E-learning & Blended Learning Methods	<ul style="list-style-type: none"> • Virtual Learning Environment using Blackboard. • Lectures recorded using Panopto. • Anonymous feedback using Learning Catalytics, and Mentimeter. • YouTube videos.
Project Learning Methods	<ul style="list-style-type: none"> • Final year individual project. • Group project work including peer review.
Assessment Strategy	
Assessment Methods	<ul style="list-style-type: none"> • Assessed coursework includes problem sheets, evaluation of laboratory/technical/project (including planning) reports, oral and poster presentations, academic tutorials, viva-voce examinations. • Examinations include in-class, mastery (online/written) and written examinations.
Academic Feedback Policy	
<p>Feedback will be provided on coursework within two weeks of submission. Feedback may be provided in one of a number of formats, including:</p> <ul style="list-style-type: none"> • 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) <p>In line with College policy, 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.</p>	
Re-sit Policy	
<p>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.</p> <p>The Departmental policy on resits for each year can be found in the regulation documents found at: http://www.imperial.ac.uk/bioengineering/admin/current-undergraduate-students/</p> <p>The College's Policy on Re-sits is available at: www.imperial.ac.uk/registry/exams/resit</p>	
Mitigating Circumstances Policy	
<p>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</p>	

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/registry/exams

Programme Structure

Year One	Pre-session	Term One	Term Two	Term Three	Term Four
Core Modules		6	9	1	
Projects				1	
Year Two	Pre-session	Term One	Term Two	Term Three	Term Four
Core Modules		7	6	1	
Projects		1			
Year Three	Pre-session	Term One	Term Two	Term Three	Term Four
Core Modules		2	2		
Elective Modules		1-4	1-4		
Projects		1			
Year Four	Pre-session	Term One	Term Two	Term Three	Term Four
Elective Modules		1-6	1-6		
Projects		1			

Assessment Dates & Deadlines

Year One

Written Examinations	December/January and May/June
Coursework Assessments	Continuous
Project Deadlines	June
Practical Assessments	Continuous

Year Two

Written Examinations	December/January and May/June
Coursework Assessments	Continuous
Project Deadlines	June
Practical Assessments	Continuous

Year Three	
Written Examinations	December/January and May/June
Coursework Assessments	Continuous
Project Deadlines	June
Practical Assessments	Continuous
Year Four	
Written Examinations	December/January and May/June
Coursework Assessments	Continuous
Project Deadlines	June
Practical Assessments	Continuous

Assessment Structure		
Year 1: Core modules x 15	60	11.1%
Year 2: Core modules x 14	60	22.2%
Year 3: Core modules x 4 Elective modules x 4 Third year group project	60	33.3%
Year 4 : Elective modules x6 MEng Individual Project	60	33.3%
TOTAL		100%
Rules of Progression		
<p>The MEng degree mark is calculated with the year weightings 1:2:3:3, so year 4 counts as 1/3 of the overall degree mark.</p> <p>In order to pass the first year examinations and qualify to progress to the second year, the candidate must achieve a pass mark in every assessment. In addition they must achieve an aggregate mark of at least 40% for Electrical Engineering Labs, Vibrations and Waves, Biomolecular Engineering 1 and Programming 1.</p> <p>In order to pass the second year examination and qualify to progress to the third year, the candidate must achieve a pass mark in each assessment.</p> <p>To proceed on the MEng programme, a student will normally be expected to achieve an aggregate year 2 mark of at least 60%. Students with an aggregate mark between 55% and 60% may be considered for progression on to the MEng at the discretion of the Director of Courses.</p> <p>In order to pass the year 3 examination and proceed to year 4 of the MEng degree, the candidate must satisfy the conditions for years 1 and 2 and following conditions on subjects taken for year 3:</p> <ul style="list-style-type: none"> (a) achieve a pass mark for each compulsory course (b) achieve an overall average mark of at least 40% across the optional courses (c) achieve a pass mark in the group project. <p>In general, the regulations for courses taken outside of the Bioengineering Department will follow those of the host Department except under exceptional circumstances where the final decision lies with the Director of Undergraduate Studies of Bioengineering.</p> <p>Students who do not fulfil the requirements to pass year 3 MEng at first attempt are required to transfer to, and proceed onto the final year of, the BEng course.</p> <p>In order to pass the year 4 examination and graduate from the MEng degree the candidate must satisfy the conditions for years 1,2 and 3 and following conditions on subjects taken in the</p>		

Bioengineering Department for year 4:

- (a) achieve an overall average mark of at least 40% across the optional courses taken
- (b) achieve a pass mark in the final year project.

In addition, the regulations for courses taken outside of the Bioengineering Department will follow those of the host Department except under exceptional circumstances where the final decision lies with the Director of Undergraduate Studies of Bioengineering.

If a student attains a mark below the pass mark in no more than one exam or item of coursework in their final year, but their aggregate is above 40% such that the failed mark is no further away from 40% than their aggregate is above 40%, and their performance in similar subjects is satisfactory enough to demonstrate their competence, the Examiners may, at their discretion, and taking into account information about the student's performance on the entire course, consider the exam a pass and allow the student to graduate.

Final Degree Classifications

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

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

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

First - a student must achieve an aggregate mark of 70%

Detailed programme structure: MEng Biomedical Engineering (All Pathways)			
Year	% Year Weighting	Module	% Module Weighting
Year One	11.1%	Mathematics 1	18.7%
		Molecules, Cells and Processes	9.3%
		Electromagnetics 1	4.7%
		Logic and Digital Systems	9.3%
		Medical Science 1	9.3%
		Electrical Engineering 1	9.3%
		Mechanics 1	9.3%
		Heat and Mass Transport 1	9.3%
		Bioengineering in Action	1.9%
		Wet Lab Skills	0%
		Electronic Build Project	0%
		Electrical Engineering Labs	4.7%
		Vibrations and Waves	4.7%
		Biomolecular Engineering 1	4.7%
		Programming 1	4.7%

MEng Biomedical Engineering (All Pathways)			
Year	% Year Weighting	Module	% Module Weighting
Year Two	22.2%	Mathematics 2	15.38%
		Engineering Design Project	7.69%
		Electromagnetics 2	7.69%
		Biomolecular Engineering 2	7.69%
		Programming 2	7.69%
		Medical Science 2	7.69%
		Electrical Engineering 2	7.69%
		Mechanics 2 Solids	7.69%
		Mechanics 2 Fluids	7.69%
		Heat and Mass Transport 2	7.69%
		Signals and Systems	7.69%
		Control Systems	7.69%
		Wet Lab Skills	0%
		Mechanics Workshop	0%

MEng Biomedical Engineering (Bioengineering Pathway)			
Year	% Year Weighting	Module	% Module Weighting
Year Three	33.3%	Modelling in Biology	10%
		Physiological Imaging and Monitoring	10%
		Biomedical Instrumentation	10%
		Biomedical Advanced and Computational Stress Analysis	10%
		<i>EITHER:</i> 2 x modules from elective group (A) and 2 x modules from elective group (B) <i>OR</i> 3 x modules from elective group (A) and 1 x module from elective group (B)	10% each
		MEng Third Year Group Project	20%
Year Four	33.3%	MEng Individual Project	40%
		At least 2 x modules from elective group (C)	10% each
		Up to 3 x modules from elective group (D)	10% each
		1 x module from elective group (E)	10%

MEng Biomedical Engineering (Mechanical Engineering Pathway)			
Year	% Year Weighting	Module	% Module Weighting
Year Three	33.3%	Modelling in Biology	10%
		Biomechanics	10%
		Physiological Fluid Mechanics	10%
		Biomedical Advanced Computational Stress Analysis	10%
		<i>EITHER:</i> 2 x modules from elective group (K) and 2 x modules from elective group (L) <i>OR</i> 3 x modules from elective group (K) and 1 x module from elective group (L)	10% each
		MEng Third Year Group Project	20%
Year Four	33.3%	MEng Individual Project	40%
		At least 2 x modules from elective group (M)	10% each
		Up to 3 x modules from elective group (N)	10% each
		1 x module from elective group (O)	10%

MEng Biomedical Engineering (Electrical Engineering Pathway)			
Year	% Year Weighting	Module	% Module Weighting
Year Three	33.3%	Modelling in Biology	10%
		Image Processing	10%
		Biomedical Instrumentation	10%
		Digital Signal Processing	10%
		<i>EITHER:</i> 2 x modules from elective group (F) and 2 x modules from elective group (G) <i>OR</i> 3 x modules from elective group (F) and 1 x module from elective group (G)	10% each
		MEng Third Year Group Project	20%
Year Four	33.3%	MEng Individual Project	40%
		At least 2 x modules from elective group (H)	10% each
		Up to 3 x modules from elective group (I)	10% each
		1 x module from elective group (J)	10%

Indicative Module List – MEng Biomedical Engineering (All Pathways)

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course -work	% Practi- cal	FHEQ Level	ECTS
BE1-HEBP	Electronic Build Project	CORE	1	3	9.5	0	12.5	100%	0%	0%	4	0.50
BE1-HEE1	Electrical Engineering 1	CORE	1	28	84.5	0	112.5	100%	0%	0%	4	4.50
BE1-HEEL	Electrical Engineering Labs	CORE	1	30	57.5	0	87.5	0%	100%	0%	4	3.50
BE1-HEM1	Electromagnetics 1	CORE	1	14	98.5	0	112.5	100%	0%	0%	4	4.50
BE1-HBIA	Bioengineering in Action	CORE	1	12.5	0	0	12.5	0%	100%	0%	4	0.50
BE1-HHMT1	Heat and Mass Transport 1	CORE	1	23	89.5	0	112.5	100%	0%	0%	4	4.50
BE1-HLDS	Logic and Digital Systems	CORE	1	36	76.5	0	112.5	90%	10%	0%	4	4.50
BE1-HMATH1	Mathematics 1	CORE	1	90	185	0	275	50%	50%	0%	4	11.00
BE1-HMCP	Molecules, Cells and Processes	CORE	1	27	85.5	0	112.5	100%	0%	0%	4	4.50
BE1-HMECH1	Mechanics 1	CORE	1	28	84.5	0	112.5	45%	55%	0%	4	4.50
BE1-HMS1	Medical Science 1	CORE	1	32	80.5	0	112.5	78%	22%	0%	4	4.50
BE1-HPROG1	Programming 1	CORE	1	28	72	0	100	50%	50%	0%	4	4.00
BE1-HVAW	Vibrations and Waves	CORE	1	60	52.5	0	112.5	0%	100%	0%	4	4.50
BE1-HBMOLE1	Biomolecular Engineering 1	CORE	1	15	85	0	100	0%	100%	0%	4	4.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course -work	% Practi- cal	FHEQ Level	ECTS
BE1-HWLS	Wet Lab Skills	CORE	1	12.5	0	0	12.5	0%	0%	100%	4	0.50
BE2-HBMOLE2	Biomolecular Engineering 2	CORE	2	28	84.5	0	112.5	60%	40%	0%	5	4.50
BE2-HCTRL	Control Systems	CORE	2	26	86.5	0	112.5	80%	10%	10%	5	4.50
BE2-HEDP	Engineering Design Project	CORE	2	55	57.5	0	112.5	0%	55%	45%	5	4.50
BE2-HEE2	Electrical Engineering 2	CORE	2	28	84.5	0	112.5	80%	20%	0%	5	4.50
BE2-HEM2	Electromagnetics 2	CORE	2	28	84.5	0	112.5	100%	0%	0%	5	4.50
BE2-HFLM	Mechanics 2 Fluids	CORE	2	28	84.5	0	112.5	78%	22%	0%	5	4.50
BE2-HHMT2	Heat and Mass Transport 2	CORE	2	28	84.5	0	112.5	80%	20%	0%	5	4.50
BE2-HMATH2	Mathematics 2	CORE	2	52	185.5	0	237.5	90%	10%	0%	5	9.5
BE2-HMEW	Mechanical Workshop Skills	CORE	2	12.5	0	0	12.5	0%	0%	100%	5	0.50
BE2-HMS2	Medical Science 2	CORE	2	28	84.5	0	112.5	100%	0%	0%	5	4.50
BE2-HPROG2	Programming 2	CORE	2	38	74.5	0	112.5	55%	45%	0%	5	4.50
BE2-HSAS	Signals and Systems	CORE	2	48	64.5	0	112.5	100%	0%	0%	5	4.50
BE2-HSDM	Mechanics 2 Solids	CORE	2	34	78.5	0	112.5	60%	40%	0%	5	4.50
BE2-HWLS	Wet Lab Skills 2	CORE	2	12.5	0	0	12.5	0%	0%	100%	5	0.50

Indicative Module List – MEng Biomedical Engineering (Bioengineering Pathway)

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
BE3-HMIB	Modelling in Biology	CORE	3	30	120	0	150	50%	50%	0%	6	6.00
BE3-HPIM	Physiological Imaging and Monitoring	CORE	3	26	124	0	150	70%	30%	0%	6	6.00
BE3-HBINST	Biomedical Instrumentation	CORE	3	30	120	0	150	50%%	50%	0%	6	6.00
BE3-HBACSA	Biomedical Advanced and Computational Stress Analysis	CORE	3	30	120	0	150	70%	30%	0%	6	6.00
BE3-MMGP	MEng Group Project	CORE	3	21	279	0	300	0%	80%	20%	6	12.00
BE3-HSYNB	Synthetic Biology	ELECTIVE (A)	3	35	115	0	150	60%	30%	10%	6	6.00
BE3-MBMX	Biomechanics	ELECTIVE (A)	3	28	122	0	150	95%	5%	0%	6	6.00
BE3-HIPR	Image Processing	ELECTIVE (A)	3	38	112	0	150	100%	0%	0%	6	6.00
BE3-HHCARD	Human Centred Design of Assistive and Rehabilitation Devices	ELECTIVE (A)	3	28	122	0	150	0%	30%	70%	6	6.00
BE3-HTERM	Tissue Engineering and Regenerative Medicine	ELECTIVE (A/C)	3/4	26	124	0	150	100%	0%	0%	6	6.00
BE3-MHASP	Hearing and Speech Processing	ELECTIVE (A/C)	3/4	28	122	0	150	100%	0%	0%	6	6.00
BE3-MBMIME	Biomimetics	ELECTIVE (A/C)	3/4	26	124	0	150	100%	0%	0%	6	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
BE3-HPFM	Physiological Fluid Mechanics	ELECTIVE (A)	3	26	124	0	150	70%	30%	0%	6	6.00
CS341	Introduction to Bioinformatics	ELECTIVE (A)	3	27	73	0	100	85%	15%	0%	6	6.00
MSE315	Biomaterials	ELECTIVE (A/C/D)	3/4	24	126	0	150	100%	0%	0%	6	6.00
CE4.31	Transport Systems for Biological Processes	ELECTIVE (A/D)	3/4	30	120	0	150	100%	0%	0%	7	6.00
N/A	Horizons	ELECTIVE (B)	3	Various			150	Various			6	6.00
N/A	Business for Professional Engineers & Scientists	ELECTIVE (B/E)	3/4	Various			150	Various			6	6.00
BE4-MMIP	MEng Individual Project	CORE	4	28	572	0	600	0%	80%	20%	7	24.00
BE9-MBIMG	Biomedical Imaging	ELECTIVE (C)	4	28	122	0	150	100%	0%	0%	7	6.00
BE9-MAPMDA	Advanced Physiological Monitoring and Data Analysis	ELECTIVE (C)	4	30	120	0	150	100%	0%	0%	7	6.00
BE9-MCNS	Computational Neuroscience	ELECTIVE (C)	4	28	122	0	150	100%	0%	0%	7	6.00
BE9-MBMI	Brain Machine Interfaces	ELECTIVE (C)	4	27	123	0	150	80%	20%	0%	7	6.00
BE9-MCBMX	Cellular Biomechanics	ELECTIVE (C)	4	28	122	0	150	80%	20%	0%	7	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
BE9-MHNCL	Human Neuromechanical Control and Learning	ELECTIVE (C)	4	28	122	0	150	80%	20%	0%	7	6.00
BE9-MOBMX	Orthopaedic Biomechanics	ELECTIVE (C)	4	28	122	0	150	60%	40%	0%	7	6.00
BE9-MAMI	Advanced Medical Imaging	ELECTIVE (C)	4	30	120	0	150	100%	0%	0%	7	6.00
BE9-MMLNC	Machine Learning and Neural Computation	ELECTIVE (C)	4	30	120	0	150	100%	0%	0%	7	6.00
E4.55	MEMS and Nanotechnology	ELECTIVE (D)	4	25	100	0	125	100%	0%	0%	7	5.00
CS341	Introduction to Bioinformatics	ELECTIVE (D)	4	27	73	0	100	85%	15%	0%	6	4.00
MSE312	Nanomaterials	ELECTIVE (D)	4	24	126	0	150	100%	0%	0%	6	6.00
MSE417	Advanced Biomaterials	ELECTIVE (D)	4	24	126	0	150	100%	0%	0%	7	6.00
MSE418	Advanced Tissue Engineering	ELECTIVE (D)	4	24	126	0	150	100%	0%	0%	7	6.00
BE9-MDEVEN	Medical Device Entrepreneurship	ELECTIVE (E)	4	27	123	0	150	0%	100%	0%	7	6.00

Indicative Module List – MEng Biomedical Engineering (Mechanical Engineering Pathway)

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
BE3-HMIB	Modelling in Biology	CORE	3	30	120	0	150	50%	50%	0%	6	6.00
BE3-MBMX	Biomechanics	CORE	3	28	122	0	150	95%	5%	0%	6	6.00
BE3-HPFM	Physiological Fluid Mechanics	CORE	3	26	124	0	150	70%	30%	0%	6	6.00
BE3-HBACSA	Biomedical Advanced and Computational Stress Analysis	CORE	3	30	120	0	150	70%	30%	0%	6	6.00
BE3-MMGP	MEng Group Project	CORE	3	21	279	0	300	0%	80%	20%	6	12.00
BE3-HSYNB	Synthetic Biology	ELECTIVE (K)	3	35	115	0	150	60%	30%	10%	6	6.00
BE3-HPIM	Physiological Imaging and Monitoring	ELECTIVE (K)	3	26	124	0	150	70%	30%	0%	6	6.00
BE3-HBINST	Biomedical Instrumentation	ELECTIVE (K)	3	30	120	0	150	50%	50%	0%	6	6.00
BE3-HHCARD	Human Centred Design of Assistive and Rehabilitation Devices	ELECTIVE (K)	3	28	122	0	150	0%	30%	70%	6	6.00
BE3-HTERM	Tissue Engineering and Regenerative Medicine	ELECTIVE (K/M)	3/4	26	124	0	150	100%	0%	0%	6	6.00
BE3-MHASP	Hearing and Speech Processing	ELECTIVE (K/M)	3/4	28	122	0	150	100%	0%	0%	6	6.00
BE3-MBMIME	Biomimetics	ELECTIVE (K/M)	3/4	26	124	0	150	100%	0%	0%	6	6.00
ME3-HFFM	Fundamentals of Fracture Mechanics	ELECTIVE (K/N)	3/4	31	119	0	150	100%	0%	0%	6	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
ME3-HCCM	Computational Continuum	ELECTIVE (K)	3	27	123	0	150	100%	0%	0%	6	6.00
ME3-HMSD	Machine System Dynamics	ELECTIVE (K/N)	3/4	32	118	0	150	100%	0%	0%	6	6.00
ME3-HTRB	Tribology	ELECTIVE (K/N)	3/4	27	123	0	150	75%	25%	0%	6	6.00
ME3-HNDM	Integrated Design and Manufacture	ELECTIVE (K/N)	3/4	31	119	0	150	0%	70%	30%	6	6.00
CO341	Introduction to Bioinformatics	ELECTIVE (K/N)	3	27	73	0	100	85%	15%	0%	6	4.00
MSE315	Biomaterials	ELECTIVE (K/N)	3	24	126	0	150	100%	0%	0%	6	6.00
CE4-31	Transport Systems for Biological Processes	ELECTIVE (K/N)	3/4	30	120	0	150	100%	0%	0%	7	6.00
N/A	Horizons	ELECTIVE (L)	3	Various			150	Various			6	6.00
N/A	Business for Professional Engineers & Scientists	ELECTIVE (L/O)	3/4	Various			150	Various			6	6.00
BE9-MMIP	MEng Individual Project	CORE	4	28	572	0	600	0%	20%	0%	7	24.00
BE9-MBIMG	Biomedical Imaging	ELECTIVE (M)	4	28	122	0	150	100%	0%	0%	7	6.00
BE9-MAPDMA	Advanced Physiological Monitoring and Data Analysis	ELECTIVE (M)	4	30	120	0	150	100%	0%	0%	7	6.00
BE9-MAMI	Advanced Medical Imaging	ELECTIVE (M)	4	30	120	0	150	100%	0%	0%	7	6.00
BE9-MCBMX	Cellular Biomechanics	ELECTIVE (M)	4	28	122	0	150	80%	20%	0%	7	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
BE9-MOBMX	Orthopaedic Biomechanics	ELECTIVE (M)	4	28	122	0	150	60%	40%	0%	7	6.00
BE9-MHNCL	Human Neuromechanical Control and Learning	ELECTIVE (M)	4	30	107.5	0	137.5	80%	20%	0%	7	5.50
BE9-MITR	Introduction to Robotics	ELECTIVE (M)	4	30	120	0	150	80%	20%	0%	7	6
BE9-MMLNC	Machine Learning and Neural Computation	ELECTIVE (M)	4	30	120	0	150	80%	20%	0%	7	6
ME3-HCCM	Computational Continuum Mechanics	ELECTIVE (N)	4	27	123	0	150	100%	0%	0%	6	6.00
ME4-MASA	Advanced Stress Analysis	ELECTIVE (N)	4	33	142	0	175	100%	0%	0%	7	7.00
ME4-MCFD	Computational Fluid Dynamics	ELECTIVE (N)	4	25	150	0	175	25%	75%	0%	7	7.00
ME4-MFEAA	Finite Element Analysis and Applications	ELECTIVE (N)	4	24	151	0	175	80%	20%	0%	7	7.00
MSE312	Nanomaterials	ELECTIVE (N)	4	24	126	0	150	100%	0%	0%	6	6.00
MSE417	Advanced Biomaterials	ELECTIVE (N)	4	24	126	0	150	100%	0%	0%	7	6.00
MSE418	Advanced Tissue Engineering	ELECTIVE (N)	4	24	126	0	150	100%	0%	0%	7	6.00
E4.55	MEMS and Nanotechnology	ELECTIVE (N)	4	25	100	0	125	100%	0%	0%	7	5.00
E4.47	Modelling of Multi-Body Mechanical Systems	ELECTIVE (N)	4	25	100	0	125	75%	25%	0%	7	5.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Writte n Exam	% Course- work	% Practic al	FHEQ Level	ECTS
AE3-414	Computational Fluid Dynamics	ELECTIVE (N)	4	26	99	0	125	70%	30%	0%	6	5.00
BE9-MDEVEN	Medical Device Entrepreneurship	ELECTIVE (O)	4	27	123	0	150	0%	100%	0%	7	6.00

Indicative Module List – MEng Biomedical Engineering (Electrical Engineering Pathway)

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practi- cal	FHEQ Level	ECTS
BE3-HMIB	Modelling in Biology	CORE	3	30	120	0	150	50%	50%	0%	6	6.00
BE3-HIPR	Image Processing	CORE	3	38	112	0	150	100%	0%	0%	6	6.00
BE3-HBINST	Biomedical Instrumentation	CORE	3	30	120	0	150	50%	50%	0%	6	6.00
E3.07	Digital Signal Processing	CORE	3	20	130	0	150	100%	0%	0%	6	6.00
BE3-MMGP	MEng Group Project	CORE	3	21	279	0	300	0%	80%	20%	6	12.00
BE3-HSYNB	Synthetic Biology	ELECTIVE (F)	3	35	115	0	150	60%	30%	10%	6	6.00
BE3-HPIM	Physiological Imaging and Monitoring	ELECTIVE (F)	3	26	124	0	150	70%	30%	0%	6	6.00
BE3-HBACSA	Biomedical Advanced and Computational Stress Analysis	ELECTIVE (F)	3	30	120	0	150	70%	30%	0%	6	6.00
BE3-HHCARD	Human Centred Design of Assistive and Rehabilitation Devices	ELECTIVE (F)	3	28	122	0	150	0%	30%	70%	6	6.00
BE3-HTERM	Tissue Engineering and Regenerative Medicine	ELECTIVE (F/H)	3/4	26	124	0	150	100%	0%	0%	6	6.00
BE3-MHASP	Hearing and Speech Processing	ELECTIVE (F/H)	3/4	28	122	0	150	100%	0%	0%	6	6.00
BE3-MBMIME	Biomimetics	ELECTIVE (F/H)	3/4	26	124	0	150	100%	0%	0%	6	6.00
E3.08	Advanced Signal Processing	ELECTIVE (F)	3	20	130	0	150	100%	0%	0%	6	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practi- cal	FHEQ Level	ECTS
E3.09	Control Engineering	ELECTIVE (F)	3	20	130	0	150	100%	0%	0%	6	6.00
E3.11	Advanced Electronic Devices	ELECTIVE (F)	3	20	130	0	150	100%	0%	0%	6	6.00
E3.12	Optoelectronics	ELECTIVE (F)	3	20	130	0	150	100%	0%	0%	6	6.00
E3.16	Artificial Intelligence	ELECTIVE (F)	3	20	130	0	150	100%	0%	0%	6	6.00
CS341	Introduction to Bioinformatics	ELECTIVE (F/I)	3/4	27	73	0	100	85%	15%	0%	6	4.00
MSE315	Biomaterials	ELECTIVE (F/H)	3/4	24	126	0	150	100%	0%	0%	6	6.00
CE4-31	Transport Systems for Biological Processes	ELECTIVE (F/I)	3/4	30	120	0	150	100%	0%	0%	7	6.00
N/A	Horizons	ELECTIVE (G)	3	Various			150	Various			6	6.00
N/A	Business for Professional Engineers & Scientists	ELECTIVE (G/J)	3/4	Various			150	Various			6	6.00
ME3-HDNVC	Design Led Innovation and New Venture Creation	ELECTIVE (G)	3	31	119	0	150	0%	70%	30%	6	6.00
BE9-MMIP	MEng Individual Project	CORE	4	28	572	0	600	0%	80%	20%	7	24.00
BE9-MBIMG	Biomedical Imaging	ELECTIVE (H)	4	28	122	0	150	100%	0%	0%	7	6.00
BE9-MAPMDA	Advanced Physiological Monitoring and Data Analysis	ELECTIVE (H)	4	30	120	0	150	100%	0%	0%	7	6.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practi- cal	FHEQ Level	ECTS
BE9-MCNS	Computational Neuroscience	ELECTIVE (H)	4	28	122	0	150	100%	0%	0%	7	6.00
BE9-MBMI	Brain Machine Interfaces	ELECTIVE (H)	4	27	123	0	150	80%	20%	0%	7	6.00
BE9-MAMI	Advanced Medical Imaging	ELECTIVE (H)	4	30	120	0	150	100%	0%	0%	7	6.00
BE9-MITR	Introduction to Robotics	ELECTIVE (H)	4	30	120	0	150	80%	20%	0%	7	6.0
BE9-MMLNC	Machine Learning and Neural Computation	ELECTIVE (H)	4	30	120	0	150	80%	20%	0%	7	6
E4.20	Full-Custom Integrated Circuit Design	ELECTIVE (I)	4	25	100	0	125	0%	100%	0%	7	5.00
E4.29	Optimisation	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00
E4.47	Modelling of Multi-Body Mechanical Systems	ELECTIVE (I)	4	25	100	0	125	75%	25%	0%	7	5.00
E4.13	Spectral Estimation and Adaptive Signal Processing	ELECTIVE (I)	4	25	100	0	125	0%	100%	0%	7	5.00
E4.16	Current-mode Analogue Signal Processing	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00
E4.17	High-performance Analogue Electronics	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00
E4.18	Radio-frequency Electronics	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00
E4.40	Information Theory	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00

Code	Title	Core/ Elective	Year	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practi- cal	FHEQ Level	ECTS
E4.55	MEMS and Nanotechnology	ELECTIVE (I)	4	25	100	0	125	100%	0%	0%	7	5.00
CS493	Intelligent Data Analysis and Inference	ELECTIVE (I)	4	27	85.5	0	112.5	85%	15%	0%	7	4.50
CS395	Machine Learning	ELECTIVE (I)	4	27	73	0	100	70%	30%	0%	6	4.00
C317	Graphics	ELECTIVE (I)	4	27	73	0	100	85%	15%	0%	6	4.00
BE9-MDEVEN	Medical Device Entrepreneurship	ELECTIVE (J)	4	27	123	0	150	0%	100%	0%	7	6.00

Supporting Information

The Programme Handbook is available at:

<http://www.imperial.ac.uk/bioengineering/admin/current-undergraduate-students/>

The Module Handbook is available at:

<http://www.imperial.ac.uk/bioengineering/admin/current-undergraduate-students/>

The College's entry requirements for undergraduate programmes can be found at:

www.imperial.ac.uk/study/ug/apply/requirements/

The College's Quality & Enhancement Framework is available at:

<http://www.imperial.ac.uk/about/governance/academic-governance/>

The College's Academic and Examination Regulations can be found at:

<http://www.imperial.ac.uk/about/governance/academic-governance/regulations/>

Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine".

<http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters-statutes-ordinances-and-regulations/>

Imperial College London is regulated by the Higher Education Funding Council for England (HEFCE)

<http://www.hefce.ac.uk/reg/of/>