



1. Programme title	BEng in Biomedical Engineering
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Details of accreditation by professional/statutory/regulatory body	Institution of Engineering Designers (IED), Institute of Physics in Engineering and Medicine (IPEM) as licensed by the Engineering Council. Accredited as partially meeting the academic requirements for Chartered Engineer (CEng) registration and fully meeting the academic requirements for Incorporated Engineer (IEng) registration
5. Final qualification(s) available	BEng (Hons) Biomedical Engineering BSc (Hons) Biomedical Engineering DipHE Biomedical Engineering CertHE Biomedical Engineering Diploma in Employability Studies.
6. Year of validation / last review Year of amendment	2014 / 2021
7. Language of study	English
8. Mode of study	Full Time / Part Time / Sandwich

9. Criteria for admission to the programme

Applicants from a range of educational experience will be considered. Acceptable qualifications include: GCE A, BTEC National Diploma, Access Certificates, Scottish Higher, Irish Leaving Certificates at higher level, International Baccalaureate and equivalent home and overseas qualifications.

Applicants are expected to have achieved passes in five GCSE subjects including mathematics and English language at grade 4 or better. Equivalent qualifications are also considered such as IELTS overall grade 6 (minimum 5.5 in all components).

Applicants are also expected to have achieved GCE A level or equivalent in a minimum of two subjects including mathematics and one other science. Qualifications are assessed using the UCAS Tariff point system. Typically, this will be a minimum of 112 points to include a grade B in Mathematics and one science subject at grade C or better.

Alternatively, successful completion of a relevant Foundation Year or Access Course that meets the appropriate mathematics pre-requisites will be acceptable. Mature applicants with suitable life skills and experience will be considered.

10. Aims of the programme

The programme aims to: develop students' analytical, technical and professional skills to such a level that they can begin a career in biomedical engineering and, after a period of appropriate

professional practice attain the professional status of Incorporated Engineer and after additional learning, attain the professional status of Chartered Engineer.

11. Programme outcomes*

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of:

1. A broad range of mathematics, relevant medical science and engineering principles in order to solve complex biomedical engineering problems
2. The principles of design of biomedical engineering problems that meet business, customer and user needs
3. The wider context of engineering practice and its underlying principles such as engineering, project and change management including intellectual property rights.
4. A range of materials, equipment, technologies and processes and their limitations
5. The medical and industrial standards and professional codes of conduct, including the importance of equality, diversity and inclusion, that enable engineers to undertake their practice in a safe, secure and ethical manner
6. The social, environmental, cultural, economic and commercial considerations affecting the exercise of engineering judgement

Teaching/learning methods

Students gain knowledge and understanding through online or on campus lectures, and seminars, online or on campus laboratories and personal research

Assessment methods

Students' knowledge and understanding is assessed by written examination, in-class exercises, written reports, articles and essays

B. Skills

On completion of this programme the successful student will be able to:

1. Select and apply first principles of mathematics, natural science and engineering science in order to analyse a range of complex problems reaching substantiated conclusions
2. Select and apply computer-aided engineering and other software tools to model a range of complex biomedical engineering problems recognising their limitations.
3. Select and evaluate technical literature and other sources of information in order to address complex engineering tasks
4. Design solutions for a range of complex problems that meet business, customer and user needs
5. Use practical, research or workshop skills to investigate a range of complex problems and realise engineering solutions
6. Function effectively as an individual and as a member of a team
7. Communicate effectively on a range of engineering matters to technical and non-technical audiences
8. Work autonomously and plan self-learning as a foundation for lifelong learning or continuous professional development.

Teaching/learning methods

Students learn skills through coursework and in-class exercises, virtual, recorded and in person laboratory sessions, virtual and on campus workshop training, and project work

Assessment methods

Students' skills are assessed by assignment submissions, design portfolios, presentations, demonstrations of physical artefacts and written reports

12. Programme structure (levels, modules, credits and progression requirements)

12.1 Overall structure of the programme

Full Time

Year 1: exit with CertHE

BMS1514 Human Sciences (30 Credits)	PDE1234 Design Practice for Biomedical Engineers (30 Credits)	MSO1210 Mathematics and Mechanics for Biomed. Engineers (30 Credits)	PDE1215 ¹ Computing for Biomedical Engineers (15 Credits)	PDE1216 ² Electronics for Biomedical Engineers (15 Credits)
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Year 2: exit with DipHE

PDE2401 Design Engineering Projects 2 (30 Credits)	PDE2900 Medical Implant Design (30 Credits)	PDE2910 Medical Standards and Professional Engagement (30 Credits)	BMS2625 Medical Instrumentation (15 Credits)	BMS2160 Physiological Measurement Systems and Control (15 Credits)
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Optional Placement Year

BMS3006 Placement for Employability (120 Credits)

Year 3 or 4: exit with BEng (Hons) or BSc (Hons) (see section 13)

PDE3696 Biomedical Engineering Major Project (60 Credits)	BMS3636 Principles of Medical Electronics (30 Credits)	BMS3646 Assistive and Mechanical Devices (30 Credits)
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All modules are delivered and assessed across terms one and two except:

1. Modules are delivered and assessed in term one only
2. Modules are delivered and assessed in term two only

Indicative Part Time Programme

Year 1: Maximum 90 credits

PDE1234 Design Practice (30 Credits)	MSO1210 Mathematics and Mechanics (30 Credits)	PDE1215 Computing (15 Credits)	PDE1216 Electronics (15 Credits)
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Year 2: exit CertHE with minimum 120 credits

BMS1514 Human Sciences (30 Credits)	PDE2401 Design Engineering Projects 2 (30 Credits)	BMS2625 Medical Instr. (15 Credits)	BMS2160 Phys. Meas. (15 Credits)
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Year 3: exit DipHE with minimum 240 credits

PDE2900 Medical Implant Design (30 Credits)	PDE2910 Medical Standards (30 Credits)	BMS3646 Assistive and Mechanical Devices (30 Credits)
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Year 4: exit with BEng (Hons) or BSc (Hons) (see section 13)

PDE3696 Biomedical Engineering Major Project (60 Credits)	BMS3636 Principles of Medical Electronics (30 Credits)
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12.2 Levels and modules

Level 4

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: BMS1514, PDE1234, PDE1215, PDE1216, MSO1210	There are no optional modules	Successful completion of all Level 4 compulsory modules

Level 5

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: PDE2401, PDE2900, PDE2910, BMS2625, BMS2160	There are no optional modules	Successful completion of all Level 5 compulsory modules
Level 6		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: PDE3696, BMS3636, BMS3646	There are no optional modules	Successful completion of all Level 6 compulsory modules to year 4 (MEng, level 7) or graduation with BEng.

12.3 Non-compensatable modules

Module level	Module code
6	PDE3696 Biomedical Engineering Major Project

13. Information about assessment regulations

In order to pass a module, a grade of 16 or better must be achieved and this must be made up from an aggregate of all components of assessment for the module. Component grades of 17 and 18 can be compensated and contribute to the aggregate, but where a component cannot be compensated at grades 17 or 18 in order to meet learning outcomes, this shall be stated in the module handbook. If a student achieves a grade of 19 or 20 for any one or more components, he/she will normally be required to resubmit all components of assessment graded at 17 to 20 inclusive.

Otherwise, University regulations generally apply except for the following where PSRB requirements are considered:

- Up to a maximum of 30 credits can be compensated at grades 17 or 18 for the award of BEng Biomedical Engineering
- If a student, enrolled on the BEng programme, can gain 360 credits at a finalist resit board with more than 30 credits compensated, they can be offered a non-accredited BSc (Hons) Biomedical Engineering, with an option to return and repeat the compensated modules to be awarded the BEng.

14. Placement opportunities, requirements and support

Students can undertake the optional yearlong placement module BMS3006. Assistance with seeking and applying for placement opportunities will be provided by the University employability service, MDXWorks. Students meet with the module and programme leader for preparation prior to the placement commencing. The student is also introduced to the health and safety aspects of placements. Students undertake experiential learning whilst on the placement with the support of a designated placement organisation supervisor, electronic material support available on the VLE and tutorial support from the module leader as well as programme specific tutor support.

Assessment of the placement module is by a negotiated learning agreement, a reflective diary of the experience, a critical report of the placement experience and a verbal presentation of the experience at a Placement Conference. The final grade for the placement module does not affect the classification of the degree but successful students will be entitled to receive a *Diploma in Employability Studies*.

Additionally, some students have secured summer placements in medical engineering departments at NHS trusts. These are highly encouraged but not supported or assessed by the university.

15. Future careers / progression

There are a number of career opportunities that arise from the study of the BEng and MEng in Biomedical Engineering. Though the larger medical equipment corporations do not have design and development departments in the UK, some do have opportunities in technical sales and service. There are, however, over 300 small to medium sized companies (SMEs) in the UK that are members of the Association of British Healthcare Industries (abhi.org.uk). Some students have found roles within these companies, while others have secured positions in NHS trusts as medical engineers or radiologists. In addition to these, students commonly progress to post-graduate education at universities in the UK and overseas. BEng graduates progress on to masters programmes at universities such as UCL and MEng students have secured funded doctoral programmes at universities such as UCL and Strathclyde.

16. Particular support for learning (if applicable)

In addition to the normal learning resources provided by the university, the programme has a dedicated teaching laboratory that is available to students when undertaking project work when it is not timetabled for teaching. The programme also makes full use of Student Learning Assistants. These are students from higher years on the programme who are paid to provide learning support during laboratories and workshops.

17. JACS code (or other relevant coding system)

H160

18. Relevant QAA subject benchmark group(s)

Engineering, which is aligned to the Engineering Council's Accreditation of Higher Education Programmes (AHEP) 4th Edition

19. Reference points

[QAA benchmark statement for Engineering Accreditation of Higher Education Programmes](#), Engineering Council.

20. Other information

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the rest of your programme handbook and the university regulations.

Curriculum map for *BEng Biomedical Engineering*

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Knowledge and understanding	
A1	A broad range of mathematics, relevant medical science and engineering principles in order to solve complex biomedical engineering problems
A2	The principles of design of biomedical engineering systems that meet business, customer and user needs
A3	The wider context of engineering practice and its underlying principles such as engineering, project and change management including intellectual property rights
A4	A range of materials, equipment, technologies and processes and their limitations
A5	The medical and industrial standards and professional codes of conduct, including the importance of equality, diversity and inclusion, that enable engineers to undertake their practice in a safe, secure and ethical manner
A6	The social, environmental, cultural, economic and commercial considerations affecting the exercise of engineering judgement
Skills	
B1	Select and apply first principles of mathematics, natural science and engineering science in order to analyse a range of complex problems reaching substantiated conclusions
B2	Select and apply computer-aided engineering and other software tools to model a range of complex biomedical engineering problems recognising their limitations.
B3	Select and evaluate technical literature and other sources of information in order to address complex engineering tasks
B4	Design solutions for a range of complex problems that meet business, customer and user needs
B5	Use practical laboratory, research or workshop skills to investigate a range of complex problems and realise engineering solutions for complex tasks
B6	Function effectively as an individual and as a member of a team.
B7	Communicate effectively on a range of engineering matters to technical and non-technical audiences
B8	Work autonomously and plan self-learning as a foundation for lifelong learning or continuous professional development.

Programme outcomes													
A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	B8
Highest level achieved													
6	6	5	6	6	6	6	6	6	6	6	6	6	6

Short Module Title	Module Code	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	B8
		Human Sciences	BMS1514	✓								✓		✓	
Design Practice	PDE1234		✓		✓	✓	✓		✓		✓	✓	✓	✓	
Mathematics and Mechanics	MSO1210	✓						✓	✓	✓				✓	
Computing	PDE1215	✓		✓	✓			✓	✓						
Electronics	PDE1216	✓			✓			✓	✓						
Design Engineering Projects	PDE2401		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Medical Implant Design	PDE2900	✓	✓		✓			✓	✓			✓			
Medical Standards	PDE2910		✓	✓		✓	✓			✓					
Medical Instrumentation	BMS2625	✓			✓			✓		✓		✓			
Physiological Measurement Systems	BMS2160	✓		✓	✓	✓		✓	✓			✓			
Placement for Employability	BMS3006			✓	✓		✓						✓		✓
Major Project	PDE3696			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Medical Electronics	BMS3636	✓	✓		✓	✓		✓	✓	✓	✓	✓			
Assistive and Mechanical Devices	BMS3646	✓			✓	✓		✓			✓	✓			