

Programme Specification for Postgraduate Programme



Leading to:

MSc Biomedical Genetics and Tissue Engineering

MSc Biomedical, Biomechanics and Bioelectronics Engineering

Applicable for all postgraduate students starting in 2021

Version No.	Date	Notes – QA USE ONLY	QAO
2021-22 v1	27 May 2021	MSc Biomedical Genetics and Tissue Engineering pathway re-established for 2021-22 intake.	JP

Postgraduate Taught Programme	
1. Awarding institution	Brunel University London
2. Teaching institution(s)	Brunel University London
3. Home college/department/division	College of Engineering, Design and Physical Sciences/ Dept of Mechanical and Aerospace Engineering
4. Contributing college/department/division /associated institution	College of Health and Life Sciences/Dept of Life Sciences/Biosciences. BPC for Generic Pre-Masters (see section 25)
5. Programme accredited by	The Institution of Mechanical Engineers (IMechE)
6. Final award(s) and FHEQ Level of Award	MSc Biomedical Genetics and Tissue Engineering - FHEQ Level 7 MSc Biomedical, Biomechanics and Bioelectronics Engineering - FHEQ Level 7
7. Programme title	MSc Biomedical Genetics and Tissue Engineering MSc Biomedical, Biomechanics and Bioelectronics Engineering
8. Programme type (Single honours/joint)	N/A
9. Normal length of programme (in months) for each mode of study	FT – 12 months (equivalent to 52 weeks) PT – 30 months (from the 1st October) entry Where students commence their programme in BPC, the normal length stated above will vary as follows: June commencement: + 4 months
10. Maximum period of registration for each mode of study	Normal length of programme (as defined above in 9) + 2 years
11. Variation(s) to September start	None for Standard Levels; See document “Validated Programme Element Specification for BPC Generic Pre-Masters (with and without work placement) for Alternative Level entry points
12. Modes of study	Full-time
13. Modes of delivery	On-campus, standard
14. Intermediate awards, titles and FHEQ Level of Award	Postgraduate Diploma in Biomedical Genetics and Tissue Engineering - Level 7 Postgraduate Diploma in Biomedical, Biomechanics and Bioelectronics Engineering - Level 7 Postgraduate Certificate in Biomedical Engineering - Level 7
15. UCAS Code	N/A
16. HECoS Code	100127
17. Route Code	H300PBIOPEN - MSc Biomedical Genetics and Tissue Engineering H300PBIOMEC - MSc Biomedical Biomechanics and Bioelectronics Engineering
18. Relevant subject benchmark statements and other external and	UK Quality Code for Higher Education QAA Subject Benchmark Statement (Engineering) Brunel 2030

internal reference points used to inform programme design	Engineering Council, UK-SPEC document “Chartered Engineer and Incorporated Engineer Standard” SARTOR specification for matching sections
19. Admission Requirements	Details of PGT entry requirements are provided on the University's and College website. Levels of English for non-native speakers are outlined on Brunel International's language requirements pages.
20. Other relevant information (e.g. study abroad, additional information on placements)	N/A
21. Programme regulations not specified in Senate Regulation 3. Any departure from regulations specified in Senate Regulation 3 must be stated here and approved by Senate.	N/A
22. Further information about the programme is available from:	Course webpage

23. EDUCATIONAL AIMS OF THE PROGRAMME

- a. To provide education at postgraduate level, which gives engineering, physical science, clinical and paramedical graduates the overall knowledge base, which is required for a career in the Biomedical Industry, in Healthcare, in Research activity or in related fields
- b. To develop the expertise, understanding and objectivity, which is required to distinguish between accurate and spurious data, to plan and manage engineering activities, to identify project objectives, to accomplish programmes of investigation and analysis, which include original research, and to report and conclude on the results.
- c. To augment the analytical and research skills, which are required to obtain detailed awareness of the latest developments in Biomedical Engineering.
- d. To create Master's degree graduates who have the understanding and expertise required to manage and to engage in extended programmes involving original research.

The MSc course in Biomedical Engineering provides a programme of study for biomedical engineers who wish to advance and update their knowledge of Biomedical Engineering practice and research. It is aimed at experienced Biomedical Engineers and those students (including overseas students) for whom the industrial training element would not be appropriate. The focus of this course is on creating Master's degree graduates who are capable of undertaking advanced product development and research.

24. PROGRAMME AND INTERMEDIATE LEARNING OUTCOMES

The programme provides opportunities for students to develop and demonstrate knowledge and understanding (K) cognitive (thinking) skills (C) and other skills and attributes (S) in the following areas:

Level 7	Category (K = knowledge and understanding, C = cognitive (thinking) skills, S = other skills and attributes)	Learning Outcome	Masters Award Only	Associated Assessment Blocks Code(s)	Associated Study Blocks Code(s)	Associated Modular Blocks Code(s)
	K	1. The overall theoretical basis underlying the disciplines involved in biomedical engineering		BB5803	BB5708 BB5809	EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	2. The principles of anatomy and physiology as applied in the biomedical context		BB5803	BB5708 BB5809	EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	3. The use of modelling, analytical and statistical methods in biomedical engineering		BB5803	BB5708 BB5809	EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	4. The application and requirements of biomedical instrumentation		BB5803	BB5708 BB5809	EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	5. The behaviour of materials in the design and performance of				EE5510 EE5624 EE5626 ME5524

		medical implants and prostheses				ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	6. The engineering design process as applied to the biomedical environment				EE5510 EE5624 EE5626 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	7. The demands of legislation, codes of practice and ethics in the practice of biomedical engineering				EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	8. Communication processes in a multidisciplinary environment.		BB5803	BB5708 BB5809	EE5510 EE5624 EE5626 GS5535 ME5524 ME5525 ME5526 ME5531 ME5548 ME5560 ME5561
	K	9. The principles of project and research management in a biomedical context	x			ME5500
	K	10. Techniques required for research and development in Biomedical Engineering	x			ME5560 ME5500
	K	11. Analytical and statistical research procedures. Data management of primary and secondary data and interpretation in Biomedical Research applications.	x			ME5500

	C	12. Analyse the requirements and potentials for biomedical systems and products.	x			ME5500
	C	13. Select and use appropriate investigative techniques	x			ME5500
	C	14. Conduct a programme of research to investigate new concepts, principles and ideas.	x			ME5500
	C	15. Conduct a programme of research to investigate new concepts, principles and ideas.	x			ME5500
	S	16. Define and organise a substantial research and investigation.	x			ME5500
	S	17. Select and employ appropriate research methods	x			ME5500
	S	18. Organise technical information into a concise, coherent document	x			ME5500
	S	19. Employ effective methods of technical communication in engineering and multidisciplinary environments.	x			ME5500
	S	20. Develop a thesis by following a coherent argument.	x			ME5500

Learning/teaching strategies and methods to enable learning outcomes to be achieved, including formative assessments

Knowledge-and-understanding learning outcomes

The fundamental principles of the learning outcomes are taught through lectures and seminars. Laboratory experiments support learning outcome 1 allowing students to demonstrate and apply key approaches
Learning outcomes 2, 3, 4 and 5 are acquired through summative coursework.
Self-study and research will underpin the teaching and learning objectives.

Material will be delivered to allow students to both broaden and deepen their engineering knowledge. The core modules provide students with fundamental principles that covers the breadth of material of this programme needed for this award while the specialist options provide students with opportunities to develop advanced and specific knowledge of their chosen stream.

Cognitive skills

Skills 6-12 are taught in lectures, and acquired through a combination of projects and assignments: other skills are acquired through the competent production of coursework assignments; and, for skill 3, through design appraisal project work.

Skill 13 is acquired through the development of an individual dissertation.

Other skills and attributes

Skills 14, 17 and 18 are acquired through the undertaking and the presentation of coursework assignments. Many of the skills are acquired through the dissertation project. Namely, skills 16 and 17 through the literature search and review, skills 15-18 through the preparation of the dissertation. Again, self-study and research will underpin the teaching and learning objectives

Summative assessment strategies and methods to enable learning outcomes to be demonstrated.

Knowledge-and-understanding learning outcomes

The outcomes are assessed using a range of methods that allow students to demonstrate their knowledge and understanding of the subject area through a combination of written assignments and unseen written exams as specified in the module details. Written work and examinations will provide students with the opportunity to demonstrate their ability to apply knowledge and understanding.

Cognitive skills

Skills are assessed using written coursework in addition to:
project reports and unseen written examinations including problem solving tasks .

Skills 4,6,7 and 8 are assessed through the dissertation project.

Other skills and attributes

All of the skills are assessed using written coursework including technical project reports. Additionally, skills 2-5 are assessed through the dissertation and skill 1 is assessed using unseen written examinations.

25. Programme Structure, progression and award requirements

Programme structures and features: levels, assessment blocks, credit and progression and award requirements

- **Compulsory block:** one which all students registered for the award are required to take as part of their programme of study. These will be listed in the left hand column;
- **Optional block:** one which students choose from an 'option range'. These will be listed in the right hand column;
- A **core assessment** is an assessment identified within an assessment block or modular block (either compulsory or optional) which must be passed (at grade C- or better) in order to be eligible to progress and to be eligible for the final award. All core assessments must be specified on the programme specification next to the appropriate assessment or modular block:

Where students are expected to pass the block at C- or better, but not necessarily all elements, then the block itself is core.

e.g. AB5500 Project (40)
Core: Block

Where only some elements of assessments are required to be passed at C- or better, these will be identified by listing each element that is core

e.g. ABXXX1 Title (XX credits)
Core: 1 & 4

Where students are expected to pass all assessments in a block then this will be identified. By setting the assessment this way, students are also required to pass the block by default. This will be identified thus:

e.g. ABXXXX Title (XX credits)
Core: All, Block

- A **non-core assessment** does not have to be passed at grade C- or better, but must D- or better in order to be eligible for the final award.

FHEQ Level 7	
<p>Compulsory assessment block codes, titles and credit <u>BIOMEDICAL, GENETICS AND TISSUE ENGINEERING - ONLY</u> (BB5803) Synoptic Assessment (30 credits)</p>	<p>Optional assessment block codes, titles and credits</p>
<p>Compulsory study block codes, titles and credit volume <u>BIOMEDICAL, GENETICS AND TISSUE ENGINEERING - ONLY</u> (BB5708) Gene Expression and Epigenetics (15) (BB5709) Cell Signalling in Health and Disease (15)</p>	<p>Optional Study block codes, titles and credit volume</p>
<p>The course consists of two streams. Each student is expected to choose one stream. The following modules are common to all modules</p> <p>(ME5525) Biomechanics and Biomaterials (15) (ME5531) Design and Manufacture (15) (ME5526) Biomedical Engineering Principles (15) (ME5560) Innovation, Management and Research Methods (15)</p> <p>ME5500 Dissertation (60 credits) Core: Block</p> <p>Compulsory modular block codes, titles and credits</p> <p><u>BIOMEDICAL, GENETICS AND TISSUE ENGINEERING - ONLY</u></p> <p>(GS5535) Tissue Engineering (15) (ME5561) Artificial Organs and Biomedical Applications (15)</p>	<p>Optional modular block codes, titles and credits</p> <p><u>BIOMEDICAL, BIOMECHANICS AND BIOELECTRONICS ENGINEERING – ONLY.</u> <u>60 credits must be selected from below</u></p> <p>(EE5510) Design of Mechatronic Systems (15) (ME5548) Biomedical Imaging (15) (ME5524) Biofluid Mechanics (15) (ME5561) Artificial Organs (15) (EE5624) Applied Sensors Instrumentation and Control (15) (EE5626) Group Project (15)</p>
<p>FHEQ Level 7 Progression and Award Requirements</p> <p>As per Senate Regulation 3</p> <p>A PGDip may be awarded by substitution of the dissertation (ME5500) for up to 30 credits of modular/assessment blocks in the taught part of the programme, provided the learning outcomes have been met.</p>	
<p>Pre-Masters</p> <p>The structure available to international students is specified in document “Validated Programme Element Specification for BPC Generic Pre-Masters”. This document also specifies the admission and progression requirements.</p>	

Please note: this specification provides a concise summary of the main features of the programme and the learning outcomes that a student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods can be found in the modular block, assessment and study block outlines and other programme and block information. The accuracy of the information contained in this document is reviewed by the University from time to time and whenever a modification occurs.