Programme Specification for Postgraduate Programme Leading to: MSc Bioprocess Engineering

Applicable for all postgraduate students starting in 2021

Version No.	Date	Notes – QUALITY ASSURANCE USE ONLY	QA
2021-22 v1.0	*1 June 2021*	*Programme set up for entrants in September 2021.*	*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/ Department of Chemical Engineering
4. Contributing College/Department/Division/ Associated Institution	Department of Chemical Engineering
5. Programme accredited by	Not Accredited
6. Final award(s) and FHEQ Level of Award	MSc Bioprocess Engineering (FHEQ Level 7)
7. Programme title	MSc Bioprocess Engineering
8. Programme type (single honours/joint)	N/A
9. Normal length of programme (in months) for each mode of study	12 months FT
10. Maximum period of registration for each mode of study	Normal (standard) plus 2 years up to a maximum of five years.
11. Variation(s) to September start	N/A
12. Modes of study	Full time
13. Modes of delivery	Standard and Block teaching
14. Intermediate awards and titles and FHEQ Level of Award	PGDip Bioprocess Engineering (FHEQ Level 7) PGCert Bioprocess Engineering (FHEQ Level 7)
15. UCAS Code	N/A
16. JACS Code/HECoS Code	100135 (Bioprocessing)
17. Route Code	H831PBIPRENG
18. Relevant subject benchmark statements and other external and internal reference points used to inform programme design	UK Quality Code for Higher Education QAA Subject Benchmark Statement (Engineering) Brunel 2030 Useful Pdf links: the IChemE's guidance for accreditation, which includes programme design (http://www.icheme.org/~/media/Documents/icheme/Membership/Accreditation/accreditationguide2016.pdf)
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 the College website.	http://www.brunel.ac.uk/cedps

23. EDUCATIONAL AIMS OF THE PROGRAMME

MSc Bioprocess Engineering provides a programme of study for engineers, separation scientists and researchers who wish to advance and update their knowledge in the Bioprocessing field. It aims to generate experienced bioprocess engineers with a detailed insight into industrially relevant processes in biopharma and food industries and their integration.

The educational aims of the programme are as follows:

1. To provide education at postgraduate level. The proposed course bridges between engineering, materials, chemical, physical and biological sciences to give graduates knowledge in the sate-of-the-art bioprocesses used in production, design and research for their future career in industrial Bioprocess engineering or related fields.

2. To develop the expertise, understanding and objectivity, which is required to work with any type of data, to plan and manage industrial and research projects, including cost and life cycle analysis.

3. To enhance students' understanding in connecting basic knowledge to innovation and creativity via both process integration module and their dissertation projects.

4. To prepare students to work in industry. Having invited industrial speakers and setting up industrially relevant, interdisciplinary dissertation projects will help students to develop a full understanding of the requirements for their future employment, including critical thinking, team work, problem solving, communication, use of IT, persuasive report writing, self-learning and an awareness of the benefit of continued professional development.

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:

FHEQ Level	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)
7						
7	K, C	Comprehensive knowledge of the fundamental scientific principles that underpin biochemical engineering and systems approach to identify problems and apply core chemical engineering principles to their analysis				CL5604
7	C, S	Comprehensive knowledge of complex scientific principles of Bioprocess Engineering and originality in their systematic application through creative thinking principles to solve complex problems				CL5601 CL5602 CL5605
7	C	Critical evaluation of state of art methodologies and practice in Bioprocess Engineering				CL5601 CL5605 CL5606

7	K	Extensive knowledge and understanding of a wide range of cutting-edge biochemical engineering processes and process equipment				CL5606 CL5607
7	C	Apply bioprocess engineering principles to investigate complex problems in the context of a range of commercial and industrial constraints				CL5602 CL5606 CL5607
7	C, S	Critical evaluation of current research and its potential impact on current practice				CL5602 CL5608
7	C, S	Assess safety requirements and its deployment in the safe design and operation of bio-chemical engineering plants				CL5608 CL5609
7	K, S	Systematic understanding, appraisal and application of design practice for biochemical engineering processes to synthesise control problems				CL5608 CL5600
7	K	Advanced understanding of the regulatory environment, legislative compliance, risk assessment & process safety				CL5609 CL5600
7	C, S	Make decisions on the basis of incomplete and contradictory information and show ability to handle uncertainty and complexity by working with multiple design objectives, and justify the decisions made				CL5609 CL5600
7	C, S	Employ relevant bioprocess engineering principles to critically evaluate abstract concepts, to deliver credible conclusions through both independent and teamwork, thereby demonstrating leadership, using creative approaches on complex industrial relevant open-ended technical problems to an optimised design, including economic, environmental and sustainability limitations	X			CL5600
7	C, S	Produce concise final individual design industrial style report, including ethical considerations and communicate effectively through presentations both within and with external teams	X			CL5600

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

In relation to the learning objectives above:
Knowledge and understanding of the theoretical areas indicated above will be acquired through lectures, seminars, group and individual projects and through self-study.
Seminars and group tutorials will be used to apply acquired knowledge via exercises and develop critical insight and reflection on the taught material.
Practical laboratory sessions are used to demonstrate and apply key approaches and bioprocess engineering techniques and to embed a strong and effective safety culture.
Directed private study is used to (a) supplement and consolidate the points above and (b) increase both the breadth and depth of individual knowledge and understanding of the subject matter.
Modern teaching methodologies and technologies will be used to ensure maximum engagement from the students. Flipped classrooms and virtual reality approaches will be incorporated into teaching.

Team learning exercises will provide students with training in communication skills and ability to work in teams as well as ability to hold a debate and justify choice of their design or solution to a set problem.

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

The assessment of all learning outcomes above is achieved by a balance of coursework and examinations (as detailed in the individual module specifications). Assessments range from written laboratory reports and exams to group work/presentations according to the demands of individual module/study blocks. The assessment strategy is developed in mind to cover all needs and abilities of students and to help them to achieve the programme learning outcomes, to make studying more interactive for the students and to help them to benefit from continued professional development.

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. AB5501 Title (15 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. AB5502 Title (15 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	
Compulsory assessment block codes, titles and credit	**Optional assessment block codes, titles and credits**
Compulsory study block codes, titles and credit volume	**Optional Study block codes, titles and credit volume**
Compulsory modular block codes, titles and credits Term 1 & 2: CL5601 Biochemical Process Engineering (15) CL5602 Innovation Toolbox (15) *And* *CL5604 Process Engineering Fundamentals (15) – conversion module for scientists* *Core: Block (for scientists only)* *And* CL5605 Upstream Processing and Production (15) CL5606 Advanced Downstream Processing I (15) CL5607 Advanced Downstream Processing II (15) CL5608 Bioprocess Engineers Toolbox (15) CL5609 Bioprocess Practice (15) *And* Term 3 & 4: CL5600 Bioprocess Design Project - Dissertation (60) Core: Block	**Optional modular block codes, titles and credits**
Progression and Award Requirements **As per Senate Regulation 3** A PGDip may be awarded by substitution of the dissertation (CL5600) for up to 30 credits of modular/assessment blocks in the taught part of the programme, provided the learning outcomes have been met.	

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.