Programme Specification for Postgraduate Programme Leading to: MSc in Advanced Manufacturing Systems (online)

Applicable for all postgraduate students starting in 2021

Version No.	Date	Notes – QA USE ONLY	QA
2021-22 v1	*13 August 2021*	*Programme for September 2021 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	None
5. Programme accredited by	Not Accredited
6. Final award(s) and FHEQ Level of Award	MSc Advanced Manufacturing Systems FHEQ level 7
7. Programme title	MSc Advanced Manufacturing Systems (online)
8. Programme type (Single honours/joint)	N/A
9. Normal length of programme (in months) for each mode of study	Online learning – Full Time – 12 months Online learning – Part Time – 24 months
10. Maximum period of registration for each mode of study	Normal length of programme plus two years up to a maximum of five years
11. Variation(s) to September start	January and May
12. Modes of study	Part Time and Full time
13. Modes of delivery	Online
14. Intermediate awards, titles and FHEQ Level of Award	PG Cert in Advanced Manufacturing Systems - FHEQ Level 7 PG Dip in Advanced Manufacturing Systems - FHEQ Level 7
15. UCAS Code	N/A
16. HECoS Code	100202
17. Route Code	H100POSAMS
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
19. Admission Requirements	Details of 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)	Students from partner institutions, and students from Brunel wishing to undertake studies at partner institutions, should refer to the AMS course flyer for further details about the structure, arrangements and further details about the programme.
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 https://info.online.brunel.ac.uk/advanced-manufacturing-systems-msc

23. EDUCATIONAL AIMS OF THE PROGRAMME

The programme aims to provide a unique learning opportunity for the students to develop in-depth knowledge and advanced skills in the theory and practice of advanced manufacturing systems and to produce the engineers/managers required for future advanced manufacturing industries.

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	Category (K = knowledge and understanding, C = cognitive (thinking) skills, S = other skills and attributes)	Learning Outcome	Masters Only	Associated Assessment Blocks Code(s)	Associated Study Blocks Code(s)	Associated Modular Blocks Code(s)
7	K1 SM1fl/SM1	A comprehensive understanding of the relevant scientific principles of advanced manufacturing.				MN5619 MN5617 MN5623 MN5618 MN5621 MN5617 MN5615 MN5612 MN5617
7	K2 SM2fl/ SM2	A critical awareness of current problems in advanced manufacturing and / or new insights at or informed at the forefront of advanced manufacturing.				MN5619 MN5617 MN5623 MN5618 MN5621 MN5617 MN5615 MN5612 MN5617
7	K3/C SM3fl/SM3	Understanding concepts relevant to advanced manufacturing, and the ability to evaluate them critically and to apply them effectively in advanced manufacturing, including engineering projects.				MN5619 MN5617 MN5623 MN5621 MN5617 MN5612 MN5617
7	C1 EA1fl/EA1	Ability to apply engineering analysis methods for solving complex problems in advanced manufacturing and to assess their limitations.				MN5619 MN5617 MN5618 MN5615 MN5620 MN5617 MN5623
7	C2 EA2fl/EA2	Ability to apply fundamental knowledge in advanced manufacturing to investigate new and emerging technologies.				MN5618 MN5615 MN5620 MN5623 MN5622
7	C3 EA3fl/EA3	Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods in an advanced manufacturing context.				MN5619 MN5617 MN5621 MN5620 MN5617 MN5622
7	C4/K D1fl/D1	Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the effect of this on the design and use theory or experimental research to mitigate deficiencies.				MN5617 MN5623 MN5618 MN5621 MN5617 MN5617

7	C5/K D2fl/D2	Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations within an advanced manufacturing context.				MN5623 MN5618 MN5621 MN5617 MN5612
7	C6 D3fl/D3	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs in advanced manufacturing.				MN5619 MN5617 MN5623 MN5621 MN5617 MN5612 MN5617
7	S1 ET1fl/ELSE1	Critical awareness of the need for a high level of professional and ethical conduct in engineering.				MN5619 MN5617
7	S2 ET2fl/ELSE2	Critical awareness that engineers need to take account of the commercial and social contexts in which they operate.				MN5619 MN5617 MN5612 MN5620 MN5615 MN5622
7	S3 ET3fl/ELSE3	Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of advanced manufacturing.				MN5619 MN5617 MN5620 MN5622
7	S4 ET4fl/ELSE4	Critical awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate.				MN5619 MN5621 MN5617 MN5620 MN5623 MN5622
7	S5/K ET5fl/ELSE5	Critical understanding of the relevant regulatory requirements governing engineering activities in the field of advanced manufacturing.				MN5621 MN5623
7	S6 ET6fl/ELSE6	Ability to make general evaluations of risk issues in the context of advanced manufacturing, including health & safety, environmental and commercial risk.				MN5619 MN5617 MN5617 MN5612 MN5620 MN5617 MN5622
7	S7/K EP1fl/EP1	Advanced level knowledge and understanding of a wide range of engineering materials and components.				MN5618 MN5623
7	S8/K EP2fl/EP2	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments.				MN5619 MN5623 MN5618 MN5621 MN5620 MN5615 MN5622

7	S9 EP3fl/EP3	Ability to apply engineering techniques, taking account of a range of commercial and industrial constraints.				MN5619 MN5617 MN5623 MN5621
7	S10 EP4fl/EP4	Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.				MN5617 MN5617
7	S11 AGS1	Apply their skills in problem solving, communication, information retrieval, working with others, and the effective use of general IT facilities.				MN5619 MN5617 MN5621 MN5617 MN5615 MN5612
7	S12 AGS2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.				MN5619 MN5617 MN5621 MN5617 MN5615 MN5612
7	S13 AGS3	Monitor and adjust a personal programme of work on an on-going basis.	X			MN5619

	Learning/teaching strategies and methods to enable learning outcomes to be achieved, including formative assessments
	The above learning outcomes will be achieved generally via online resources, directed private studies, course work and research project. Online resources include videos, electronic flashcards, reading lists, exercises / tasks and discussion forums for liaising with peers and teaching assistants. Videos are used to teach key concepts, principles and problem solving methods, and examples. Additional online resources are used to enhance the learning through summaries and exercises, to develop critical insight and to reflect on material. Directed private study is used to supplement the learning and further broaden the knowledge and understanding of the subject matter. The coursework and the research project will consolidate the learning and provide opportunities and experiences in identifying, defining and analysing problems, applying learned knowedge and skills to solve the problemes and presenting the results and findings. Delivery is supported by InterActive Pro. More specifically, the program learning outcomes can be achieved with the following strategies and methods: **Knowledge and Understanding** K1 and K2 are achieved from the studies of four different themes, i.e. design, manufacturing, metrology and management themes of the programme where the comprehensive knowledge and latest problment and developments of modern manufacturing systems are covered, including computer aided engineering, manufacturing methods/sytems and technologies (e.g discrete event modelling and simulation, applied control, robotics), advanced manufacturing measurement system and data analysis, quality management and reliability, logistics and global supply chain management and global manufacturing enterprise business development K3 is achieved from the integration theme, i.e. research method and research project where the concepts of all the above four themes can be critically evaluated and applied effectively in advanced manufacturing systems. **Cognitive** C1-C3 will be achieved primarily through research method and research project to apply engineering analysis methods for solving complex problems and assess their limitationsn, to investigate new and emerging technologies and to use appropriate engineering analysis tools and methods. C4-C6 will be achieved through the teaching and learning programme developed above. Assignments and exercises will augment the development of analytical and design skills in a supportive learning environment. **Practical/Professional/Transferrable** S1-S14 will be achieved through the coursework and research project. The student shall consider his/her work in the context of Economic, Legal, Social, Ethical and Environmental concerns and develop the professional understanding and critical awareness of these factors.

	Summative assessment strategies and methods to enable learning outcomes to be demonstrated.
	Programme learning outcomes are mapped to all the modules. Each module will detail what learning outcomes will be covered and how they will be assessed. The general summative assessment strategies and methods are as follows: **Knowledge and Understanding** K1 and K2 will be assessed through a range of substantial coursework, which require 1) advanced integration of a comprehensive range of the underpinning principles with the developing technologies relevant to advanced manufacturing systems to identify advanced solutions; 2) well-informed, insightful analysis of state-of-the-art developments in advanced manufacturing systems, demonstrating the ability to critically appraise the emerging technologies and solutions. K3 will be assessed through the research project involving the student to go through the process of applying and integrating their knowledge of a range of engineering disciplines i.e. the process of engineering problem analysis to synthesize the solution, which also takes into account concepts and factors influencing the solution that are external to the discipline. **Cognitive** C1-C3 will be assessed through research project involving the student to use engineering analysis and making design choices. The projects will be assessed by a combination of a formal report and a presentation. In addition, coursework will allow students to demonstrate that they have met C4-C6. **Practical/Professional/Transferrable** S1-S14 will be primarily assessed through research project involving the student to consider his/her work in the context of Economic, Legal, Social, Ethical and Environmental concerns. The coursework will require the student to consider these factors as part of a problem relevant to advanced manufacturing.

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.

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 All modules are 15 credits unless otherwise specified MN5621 Computer Aided Engineering 1 MN5617 Systems Modelling and Simulation MN5623 Automation and Robotics MN5618 Advanced Measurement Systems and Data Analysis MN5615 Quality Management & Reliability MN5622 Global Manufacturing Enterprise Business Development MN5612 Logistics and Global Supply Chain Management MN5620 Research Methods for Engineering Projects MN5619 Research Project (60 credits) – Core Block	**Optional modular block codes, titles and credits**
Level 7 Progression and Award Requirements **As per Senate Regulation 3** A PGDip may be awarded by substitution of the dissertation (MN5619) for up to 30 credits of modular/assessment blocks in the taught part of the programme, provided the learning outcomes have been met.	