

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



Applicable for all postgraduate students starting in 2021

Version No.	Date	Notes – QA USE ONLY	QA
2021-22 v1	13 August 2021	Programme Specification for 2021/22 entrants.	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	The Institution of Mechanical Engineers (IMechE). The Institution of Engineering and Technology (IET)
6. Final award(s) and FHEQ Level of Award	MSc Advanced Manufacturing Systems FHEQ level 7
7. Programme title	MSc Advanced Manufacturing Systems
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 length of programme plus two years up to a maximum of five years
11. Variation(s) to September start	No.
12. Modes of study	FT
13. Modes of delivery	Standard
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	H100PSAMS
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 Brunel Placement Learning Policy, as published under the 'Placements' section of the ' Managing Higher Education Provision with Others ' page.
19. Admission Requirements	For current admission requirements for this programme click here .
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 website

23. EDUCATIONAL AIMS OF THE PROGRAMME

This course is designed to address the challenges of modern Manufacturing and Enterprise Systems. It covers a breadth of subjects that enable candidates to appreciate and deal with the complexities of modern Industrial Environments. The AMS graduates will be educated in the latest techniques in manufacturing and systems engineering in:

1. Efficient and economical performance of Industrial systems ranging from manufacturing, finance, transport, health, and public services.
2. Managing and providing solutions for advanced automated and semi-automated industries.
3. Application of advanced computer and mathematical modelling for improved performance, design and management of industrial systems.
4. The latest advanced material technology and micro/nano manufacturing to achieve highest manufacturing capabilities.
5. Management and implementation of Projects and Operations under time and resource constraints.
6. Choice of a breadth and depth training in microprocessors and embedded systems, quality management and reliability, global manufacturing or project management.

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 Only	Associated Assessment Blocks Code(s)	Associated Study Blocks Code(s)	Associated Modular Blocks Code(s)
	K 1	Theoretical basis underpinning the study of manufacturing systems				MN5562, MN5610 MN5552, MN5543, MN5557, MN5502 EE5510 MN5547 MN5506
	K 2	Concepts of systems approach, including the latest techniques and software/hardware tools.				MN5543 MN5502 EE5510
	K 3	Principles and concepts underpinning the operation and management of modern manufacturing enterprises				MN5502 MN5552 MN5554 MN5508 MN5547 MN5506 MN5610
	K 4	Concepts and theories of automation and industrial systems.				MN5552, MN5543 EE5510
	K 5	Principles of sustainable design and the manufacture of products.				MN5557, MN5502 MN5554
	K 6	Principles of design and computer aided engineering				MN5562 MN5543 MN5557 EE5510
	C 1	Systematically evaluate appropriate techniques for the solution of problems in manufacturing systems				MN5562, MN5552, MN5543, MN5557, MN5502 EE5510 MN5547 MN5506

	C 2	Plan, conduct and evaluate a complex programme of work leading to a major dissertation.	X				MN5501, MN5508
	C 3	Analyse and make informed judgements in the design of a manufacturing or industrial systems.					MN5562, MN5557, MN5502 EE5510
	C 4	Analyse, make informed judgements and plan strategies for organisations implementing advanced Manufacturing methods.					MN5562, MN5502 MN5610, MN5554 MN5508 MN5547 MN5506
	C 5	Appraise the performance of a Manufacturing or industrial system from key data acquisition and observation.					MN5543, MN5557, MN5554, MN5563 EE5510
	C 6	Specify, design and manage advanced manufacturing systems.					MN5543, MN5557, MN5502 MN5554 MN5547
	C 7	Demonstrate self-direction and apply independent thinking skills.					MN5562 MN5502, MN5501, MN5508
	S 1	Present succinctly to various audiences rational and reasoned arguments that address both complex technical and business issues related to industrial systems.					MN5543, MN5557, MN5501
	S 2	Effectively gather, analyse and synthesise technical and business process information from a range of sources.					MN5562, MN5610, MN5543, MN5502, MN5554, MN5563 MN5508 MN5547 MN5506
	S 3	Work as a member of a team and demonstrate conflict solving and leadership skills at a professional or equivalent level.					MN5552, MN5557
	S 4	Manage people, time and resources.					MN5543, MN5557, MN5502, MN5501, MN5508
	S 5	Use advanced and design industrial control and embedded technologies to improve and optimise overall system performance.					MN5552, MN5543

	<p>Learning/teaching strategies and methods to enable learning outcomes to be achieved, including formative assessments</p>
	<p>Knowledge and Understanding</p> <p>Acquisition of K1 is gained from the “technology scheme” of the programme where the technological challenges of modern industrial systems. The scheme provides the necessary skills to tackle issues in manufacturing methods, design, applied control, precision manufacturing, and computer aided design and manufacture. These modules are delivered in both lecture rooms and state of the art laboratories. The students will be supervised for ‘hands-on’ sessions.</p> <p>Acquisitions K2, K3 and K6 are achieved from the “systems scheme” of the programme where modern mathematical tools for measuring systems performance techniques such as, discrete event simulation, modelling, stochastic analysis, queueing theory, quality and reliability issues.</p> <p>These are also taught in the lecture room and enhanced with laboratory exercises and tutorials on modelling and simulation. A key feature of these activities is group work.</p> <p>Acquisitions K4 & K5 are achieved from the “enterprise scheme” of the programme. This part of the programme enables the student to appreciate the necessary management skills in small and large manufacturing organisations. The lectures and labs are designed to provide the students with the opportunity to appreciate the operations involved in modern systems and acquire the necessary skills to design and manage supply chains, electronic processes and integrations.</p> <p>The optional modules in the course extend the reach of the programme provision, and provide specialisation in specific areas such as industrial control or project and financial management.</p> <p>The learning experience will be enriched through team assignments, group presentations and individual projects. The individual projects will be focused on real issues and problems that are given by our industrial partners.</p> <p>Cognitive</p> <p>Cognitive skills are developed through the teaching and learning programme developed above. Assignments and laboratory exercises will augment the development of analytical and design skills in a supportive learning environment.</p> <p>In addition to the tutorial hours built into the module specifications, special ‘surgeries’ will be held for students needing help outside of the main teaching week.</p> <p>The suite of modules and the exposure to modern technology (e.g. latest software tools) will create the suitable platform for achieving the abilities mentioned in Items (C1-C7)</p> <p>Practical/Professional/Transferrable</p> <p>S1 is taught in MN5501 Dissertation and reports and presentations given by students for MN5557 Sustainable Design and Manufacture and MN5543 Systems Modelling and Simulation modules.</p> <p>S2 is taught through supervision of group or individual projects/assignments. Also modules such as MN5543 Systems Modelling and Simulation and MN5554 Quality Management & Reliability, and MN5502 Manufacturing Systems Design and Economics modules</p> <p>S3 is taught through group-work assignments as well as, MN5610 Advanced Measurement Systems and Data Analysis, MN5557 Sustainable Design and Manufacture, MN5552 Robotics and Manufacturing Automation, and MN5562 Computer Aided Engineering 1 modules.</p> <p>S4 is reinforced through group assignments and project work as well as MN5543 Systems Modelling and Simulation, MN5502 Manufacturing System Design and Economics and MN5508 Project Management (optional module).</p> <p>S5 is enforced through individual dissertation projects and the taking of the optional module MN5552 Robotics and Automation,.</p>

	<p>Summative assessment strategies and methods to enable learning outcomes to be demonstrated.</p>
	<p>Knowledge and Understanding</p> <p>Each of the seven areas is assessed through written assignment, project-work and examinations. The specific ways in which each area is assessed is spelled out in the appropriate module outline.</p> <p>Cognitive</p> <p>The main dissertation project is the primary method for the assessment of C1. The Guidelines for Marking Dissertations spell out the descriptors for assessing the attainment of each student.</p> <p>Analysis and problem solving skills (C2 and C3) will be assessed through written exams, some open-book. Design and implementation skills (C4) will be assessed using assignments. C5 will be assessed through assignments and exams.</p> <p>Mini projects in which the participants will have to demonstrate their ability to work at a professional level will link several modules. This and the dissertation project will assess C6.</p> <p>C6 is also encouraged by the overall programme with the integrated modules and projects that reinforce analytical thinking.</p> <p>C7 is developed throughout the programme</p> <p>Practical/Professional/Transferrable</p> <p>The main dissertation based project provides a means for the assessment of the S1, S2 and S4. The Guidelines for Marking Dissertations spell out the descriptors for assessing the attainment of each student. The group-working skills (S3) are assessed in various lab and group assignments.</p>

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	
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 MN5562 Computer Aided Engineering 1 MN5610 Advanced Measurement Systems and Data Analysis MN5552 Robotics and Manufacturing Automation MN5543 Systems Modelling and Simulation MN5557 Sustainable Design and Manufacture MN5502 Manufacturing Systems and Economics MN5501 Dissertation (60cr) Core: Block	Optional modular block codes, titles and credits All modules are 15 credits unless otherwise specified MN5554 Quality Management & Reliability EE5510 Design of Mechatronic Systems MN5508 Project Management MN5547 Logistics and Global Supply Chain Management Students will choose two of the available optional modules.
FHEQ Level 7 Progression and Award Requirements As per Senate Regulation 3 A PGDip may be awarded by substitution of the dissertation (MN5501) 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.