

**Programme Specification for Postgraduate Programme
Leading to:
MSc in Advanced Mechanical Engineering
MSc in Advanced Mechanical Engineering with Internship
MSc in Advanced Mechanical Engineering with Placement**



Applicable for all postgraduate students starting in 2022

<u>Version No.</u>	<u>Date</u>	<u>Notes – QA USE ONLY</u>	<u>QA</u>
1.0	18/07/2022	New specification for September 2022, updated in Design Review March 2022	SK

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 Mechanical and Aerospace Engineering
4. Contributing college/department/division /associated institution	None
5. Programme accredited by	Institution of Mechanical Engineers
6. Final award(s) and FHEQ Level of Award	MSc in Advanced Mechanical Engineering - FHEQ Level 7 MSc in Advanced Mechanical Engineering with Internship - FHEQ 7 MSc in Advanced Mechanical Engineering with Placement - FHEQ 7
7. Programme title	MSc Advanced Mechanical Engineering
8. Programme type (Single honours/joint)	N/A
9. Normal length of programme (in months) for each mode of study	MSc: Full-time 12 months MSc with Internship: Full-time 15 months MSc with Placement: Full-time 24 months
10. Maximum period of registration for each mode of study	The normal length of programme plus two 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
14. Intermediate awards, titles and FHEQ Level of Award	PGDip in Advanced Mechanical Engineering - FHEQ Level 7 PGCert in Advanced Mechanical Engineering - FHEQ Level 7 MSc Engineering (Advanced Mechanical Engineering) – FHEQ L7 MSc Engineering (Advanced Mechanical Engineering) with internship – FHEQ L7 MSc Engineering (Advanced Mechanical Engineering) with placement – FHEQ L7
15. UCAS Code	N/A
16. HECoS Code	100190
17. Route Code	H300PADVME
18. Relevant subject benchmark statements and other external and internal reference points used to inform programme design	UK Quality Code for Higher Education which includes the English Framework for Higher Education Qualifications within Part A on Setting and Maintaining Academic Standards 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. IMechE Position Statement on UK-SPEC. IMechE Degree Accreditation Information for Universities Engineering Council, UK-SPEC document “Chartered Engineer and Incorporated Engineer Standard” Engineering Council, Accreditation of Higher Education Programmes (AHEP)

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)	<p>Internships and Placements are undertaken after completion of the MSc programme (taught and dissertation components) and provide significant flexibility for applicants who can attain a Master's degree, with or without working in an industrial setting.</p> <p>The responsibility for finding an internship/placement lies with the student, as the University cannot guarantee any form of work experience, just the opportunity to undertake it if available.</p> <p>There will be supervision, guidance and support for students embarking on the placement. Students who cannot secure a placement by the end of Term 2 after enrolling on the programme, will be reverted to the full-time programme.</p>
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.	<p><u>MSc</u></p> <p>For an accredited award, students may not be allowed an aegrotat pass on any module or have more than 20 credits of allowed failure (D-, D or D+) throughout their entire profile.</p>
22. Further information about the programme is available from:	Course webpage

23. EDUCATIONAL AIMS OF THE PROGRAMME

This major course in Mechanical Engineering will develop the student's knowledge, understanding and skills in subjects related to the discipline, with close links to both existing MEng courses and significant research in the College. The main aim of this programme is to create Master's Degree graduates with qualities and transferable skills for challenging employment in generic mechanical engineering industries. The elective themes of Fluids Engineering and Solid & Structural Mechanics provide students with ideal skills to solve real-world engineering problems, including elements of robotics, materials and manufacturing,, engineering design and sustainable energy technologies. The graduates will have the independent learning ability required for continuing professional development and acquiring new skills at a high level.

The focus of the programme is to create graduates who are well equipped with the knowledge and skills to work in multidisciplinary and interdisciplinary subject areas of mechanical engineering. The program assists students to develop their imagination and creativity to follow a successful engineering career and enables the students to attain senior positions within national and international engineering companies and organisations. The programme is designed to allow students to develop themes of expertise in particular subject areas, mainly through the group project and dissertation. The course also provides a useful introduction for students who may wish to study for a higher degree.

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)
Masters and FHEQ level 7						
	K [SM7M, SM8M] [EA6M, EA5m] [P12M]	1. Develop comprehensive knowledge and understanding of the advanced theoretical basis underpinning principles, current problems and new insights in the fields of mechanical materials and manufacturing engineering				ME5691 ME5557 ME5693 ME5506 ME5696 ME5694 ME5689
	K [SM7M, SM8M, SM9M] [EA6M, EA5m] [D9M, D11M]	2. Develop comprehensive knowledge and understanding of the processes supporting the techniques applicable to research.				ME5691 ME5557 ME5693 ME5696 ME5500 L7-92 ME5694 ME5689
	K [SM7M, SM8M] [D9M, D10M]	3. Develop comprehensive knowledge and understanding of the principles underlying advanced computational methods applied to mechanical materials and manufacturing engineering				ME5542 ME5691 ME5693 ME5696 ME5694 ME5689
	K [EL8M, EL9M, EL10M, EL11M, EL12M, EL13M] [G1]	4. Develop comprehensive knowledge and understanding of the demands of implementing management in an innovative engineering environment.				ME5641 ME5542 ME5500 L7-92
	K [SM7M, SM8M, SM9M] [EA6M, EA5m, EA7M] [D9M, D10M, D11M] [EL8M, EL9M, EL11M, EL12M] [P9m]	5. Develop comprehensive knowledge and understanding of complex and advanced engineering design/application in mechanical, materials and manufacturing engineering.				ME5542 ME5691 ME5506 L7-92 ME5689
	C [SM7M, SM9M] [EA6M, EA5m, EA7M] [D9M, D10M] [P12M]	6. Systematically evaluate the appropriate techniques for the solution of engineering problems				ME5557 ME5691 ME5693 ME5506 ME5696 L7-92 ME5694
	C [EA6M] [D9M, D10M, D11M] [EL9M, EL13M]	7. Identify and analyse the complex design requirements for an engineering problem.				ME5542 L7-92
	C [D9M, D10M, D11M] [EL9M, EL13M]	8. Critically evaluate the performance and design of existing engineering solutions				ME5542 ME5691 ME5696

		with the application of the principles to new systems.				L7-92 ME5694
	C [G1]	9. Plan, and comprehensively appraise personal projects.	x			ME5500 L7-92
	C [SM8M] [EL8M, EL9M, EL10M, EL11M, EL12M, EL13M] [P10m]	10. Identify and apply complex codified data and specifications in the delivery of projects and in doing so professionally and ethically demonstrate awareness of industrial or commercial applications and limitations.	x			ME5500 L7-92
	C [EA7M] [D11M]	11. Assemble and critically analyse cutting edge and innovative primary, secondary and incomplete data and from this design a system or product.	x			ME5500 L7-92
	C [P9m, P10m]	12. Critically evaluate and apply investigative techniques that are appropriate to the project and identify current practice, limitations, and new developments and industrial constraints.	x			ME5500 L7-92
	C [SM8M]	13. Evaluate critically current research to develop a thesis/project by presenting coherent arguments.	x			ME5500 L7-92
	C [EL9M] [P9m, P11m] [G2]	14. Integration into diverse teams to meet changing technical and managerial needs. Perception/self-awareness of one's skills as a coach or mentor and how these may be improved.				ME5641 ME5500 L7-92
	S [SM7M] [EA6M, EA5m, EA7M] [D9M] [EL9M, EL11M, EL13M] [P9m, P10m, P11m] [G1, G2, G3m, G4]	15. Design and implement advanced engineering systems and in doing so analyse and apply complex mathematical or technical solutions and physical principles.				ME5557 ME5691 ME5693 ME5506 ME5696 L7-92 ME5694
	S [G1, G2, G3m, G4]	16. Define and organise a substantial investigation that is informed by the field of study through advanced study. Demonstrating self-direction in planning and implementation.	x			ME5500 ME5641 L7-92 ME5689
	S [EL11M, EL13M] [G1, G3m, G4]	17. Appraise and critically evaluate appropriate research methods	x			ME5500 ME5641 L7-92
	S [G1]	18. Apply complex skills in problem solving, communication, information retrieval, working with others and effectively use general IT facilities.	x			ME5500 ME5641 L7-92
	S [G1]	19 Systematically and creatively consolidate and present technical information into a concise, coherent document	x			ME5500 ME5641 L7-92

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. Skills 13-14 are acquired mainly through the development of an individual dissertation and group project work.

Other skills and attributes

Skills 15, 18 and 19 are acquired through the undertaking and the presentation of coursework assignments. Many of the skills are acquired through the dissertation and group projects. Namely, skills 17 and 18 through the literature search and review, skills 16-19 through the preparation of the individual dissertation and group project reports. 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: individual and group project reports and unseen written examinations including problem solving tasks. Skills 4, 6, 7 and 8 are assessed through the dissertation and group projects.

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.

Full-Time Masters and FHEQ Level 7 – FOR FULL-TIME ROUTES ONLY	
Compulsory assessment block codes, titles and credit	Optional assessment block codes, titles and credits
Compulsory study block codes, titles and credit volume Compulsory for <i>with Internship and with placement</i> L7-Pre P Mechanical Engineering (inc. Advanced Mechanical Engineering Aerospace Engineering Automotive and Motorsport Engineering) Pre-Placement Study Block (0 credits)	Optional Study block codes, titles and credit volume
Compulsory modular block codes, titles and credits ME5694 Robotics and Automation (15 credits) ME5641 Strategy and Business Planning (15 credits) ME5542 Advanced Modelling and Design (15 credits) L7-92 MSc Mechanical Engineering Group Project (30 credits) ME5500 Dissertation (60 credits) Core: Block	Optional modular block codes, titles and credits Students should choose one of the two themes below. <u>Theme A – Solid & Structural Mechanics</u> ME5691 Advanced Solid Body Mechanics and FEA (15 credits) ME5557 Dynamics and Modal Analysis (15 credits) ME5689 Advanced Materials and Manufacturing (15 credits) <u>Theme B – Fluids Engineering</u> ME5693 Advanced Thermofluids (15 credits) ME5696 Principles of Heat Transfer (15 credits) ME5506 Energy Conversion Technologies (15 credits)
Masters and FHEQ Level 7 – “with Internship”	
Compulsory modular block codes, titles and credits ME5647 Internship Core: Block	
Masters and FHEQ Level 7 – “with Placement”	
Compulsory modular block codes, titles and credits ME5648 Placement Core: Block	
Masters and FHEQ Level 7 Progression and Award Requirements For an accredited award, students may not be allowed an aegrotat pass on any module or have more than 20 credits of allowed failure (D-, D or D+) throughout their entire profile. As per Senate Regulation 3 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.	

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.