

Programme Specification for Postgraduate Programme Leading to: MSc Electric Vehicle Systems

Applicable for all postgraduate students starting in 2022

<u>Version No.</u>	<u>Date</u>	<u>Notes – QUALITY ASSURANCE USE ONLY</u>	<u>QA</u>
2022-23 v1	19/05/2022	New programme and award approved by Senate Chair's Action on 18 May 2022. Programme to commence in September 2022.	SK
2022-23 v1.1	22/06/2022	New block codes EE5631, EE5632 and EE5633	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/ Dept of Electronic and Electrical Engineering
4. Contributing College/Department/Division/ Associated Institution	None
5. Programme accredited by	To be submitted to the Institution of Engineering Technology and the Energy Institute for accreditation
6. Final award(s) and FHEQ Level of Award	MSc Electric Vehicle Systems FHEQ Level 7
7. Programme title	MSc Electric Vehicle Systems
8. Programme type (single honours/joint)	N/A
9. Normal length of programme (in months) for each mode of study	FT: 12 Months.
10. Maximum period of registration for each mode of study	Normal or standard duration plus 2 years up to a maximum of five years.
11. Variation(s) to September start	N/A
12. Modes of study	FT
13. Modes of delivery	Standard
14. Intermediate awards and titles and FHEQ Level of Award	Postgraduate Diploma Electric Vehicle Systems: FHEQ Level 7 Postgraduate Certificate in Electric Vehicle Systems: FHEQ Level 7 MSc Engineering (Electric Vehicle Systems): Level 7
15. UCAS Code	N/A
16. HECoS Code	100163
17. Route Code	67FHPELVESYS

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	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.	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 whole profile. Any student failing to meet this criteria will be formally transferred to the non-accredited version of their degree at the next Board of Examiners. To achieve a C- grade or better in any module students must not have a grade below D- in assessment elements weighted 30% or above
22. Further information about the programme is available from the College website.	https://www.brunel.ac.uk/electronic-and-electrical-engineering

23. EDUCATIONAL AIMS OF THE PROGRAMME

The primary aim of this programme is to produce MSc graduates with advanced and broad knowledge and skills relevant to a demanding and dynamic electric vehicle sector i.e., power electronics and drives, vehicular communication systems, sustainable power systems, intelligent systems, and embedded systems.

Specific aims are as follows:

- 1) To develop an in-depth knowledge in electric vehicle systems that will help to deal with new, complex and unusual challenges across a range of electrical and electronics issues.
- 2) To develop imagination, initiative and creativity to enable graduates for problem solving.

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:

Masters FHEQ 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)	Associate d Study Blocks Code(s)	Associated Modular Blocks Code(s)
Masters and FHEQ level 7						
7 M1	K,C	Apply a comprehensive knowledge of mathematics, statistics, natural science				EE5632, EE5631, EE5500,

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Location: <https://intra.brunel.ac.uk/s/QSO/Team/Programmes/Templates and Proformas/Programme Specification Templates>

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		and engineering principles to the solution of complex electric vehicle problems. (Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.)				EE5622, EE5630, EE5623, EE5624; EE5518
M2	K,C	Formulate and evaluate complex problems in electric vehicle systems to reach substantiated conclusions. (This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed.)				EE5631, EE5632, EE5500, EE5625, EE5627, EE5622, EE5630, EE5624; EE5518; EE5633
M3	K,C	Select and apply appropriate computational and analytical techniques to model complex electric vehicle system problems, discussing the limitations of the techniques employed				EE5631, EE5632, EE5627, EE5622, EE5630, EE5623, EE5624; EE5633
M4	K,C	Select and critically evaluate technical literature and other sources of information to solve complex electric vehicle system problems				EE5631, EE5632, EE5500, EE5627, EE5630, EE5623; EE5633
M5	K,C	Design solutions for complex electric vehicle system problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. (This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.)				EE5627, EE5500, EE5625, EE5630, EE5623, EE5624; EE5518; EE5633

M7	C,S	Evaluate the environmental and societal impact of solutions to complex electric vehicle system problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.				EE5500, EE5625, EE5630; EE5518; EE5633
M16	S	Ability to function effectively as an individual, and as a member or leader of a team and the ability to evaluate effectiveness of own and team performance.				EE5623; EE5518; EE5632
M17	C,S	Communicate effectively on complex electric vehicle system matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.				EE5631, EE5632, EE5627, EE5500; EE5518

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

Knowledge and understanding in the areas indicated and the cognitive skills are acquired through a mix of lectures, workshops, seminars, self-study, and individual and group project work. In lectures, key concepts and ideas are introduced, definitions are stated, techniques are described, and immediate student queries discussed. Seminars offer the students with the opportunity to discuss at greater length issues occurring from lectures. Workshops sessions are used to promote practical engagement with the taught material.

The dissertation project constitutes a key role in supporting literature review in a technically complex area and to organise, deliver and evaluate a substantial investigation into a present problem area related to electric vehicle systems.

Other skills and attributes are developed mainly through completion of well-designed lab exercises, completion of group assignments and dissertation project.

The on-campus MSc Electric Vehicle Systems is delivered in standard mode.

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

Assessment will allow students to demonstrate their abilities in a range of styles relevant to professional Electrical and Electronics Engineers. These will include:

- Essays and reports – demonstration of depth and breadth of knowledge and written communication skills
- Technical analytical reports – ability to collect, analyse and interpret a range of evidence, including in the laboratory
- Group report – contribution as a team member to a collaborative challenge
- Formal examinations – ability to quickly formulate arguments and solve problems
- Dissertation – ability to plan, critically review, execute and communicate an advanced piece of research – EE5500, the Dissertation specification, requires students to undertake research relevant to their specific programme.

Deadlines will be distributed through the year, allowing time for constructive feedback.



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.

Masters and 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	Optional modular block codes, titles and credits
EE5631 Advanced Vehicular Systems Technology (15 Credits) EE5632 Power Electronics and Drives (15 Credits) EE5630 Advanced Embedded Systems Design (15 Credits) EE5518 Energy Economics and Power Markets (15 Credits) EE5633 Smart Grid Operation and Management (15 Credits) EE5625 Engineering Ethics and Sustainability (15 Credits) EE5500 Project and Dissertation (60 credits – Core Block)	Need to select 2 modules EE5624 Applied Sensors, Instrumentation and Control (15 Credits) EE5622 Communication Network Technologies (15 Credits) EE5627 Artificial Intelligence System Techniques (15 Credits) EE5623 Design for Internet of Things (15 Credits)
Please note: To achieve a C- grade or better in any module students must not have a grade below D- in assessment elements weighted 30% or above	Please note: To achieve a C- grade or better in any module students must not have a grade below D- in assessment elements weighted 30% or above

Masters and FHEQ Level 7 Progression and Award Requirements

As per [Senate Regulation 3](#)

For the accredited award of MSc Electric Vehicle Systems, students may not be allowed an aegrotat pass on any module or have more than 20 credits of allowed failure (D-, D or D+) in their whole profile. Any student failing to meet this criteria (but meets the requirements specified in senate regulation 3) will be transferred to the non-accredited version of their degree, MSc Engineering (Electric Vehicle Systems), at the Board of Examiners

A PGDip may be awarded by substitution of the dissertation (EE5500) 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.