

PROGRAMME SPECIFICATION (Taught Postgraduate)	 Newcastle University
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1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	MSc
4	Programme Title	Embedded Systems and internet of Things Electronic Engineering (exit award)
5	Programme Code	5134F 5468F (exit award)
6	Programme Accreditation	Institute of Engineering Technology 5134F Only
7	QAA Subject Benchmark(s)	Engineering
8	FHEQ Level	7
9	Last updated	May 2025

10	Programme Aims
The programme aims: • Provide an understanding of the concept and theories of interconnected Embedded Systems within a paradigm of Internet of Things (ES-IoT). • Equip graduates with knowledge and experience of the enabling technologies, including the fundamental techniques required for an engineer, scientist or manager working in this field. • Develop skills in the application of these techniques in the development of their constituent parts and the system as a whole. • Promote sound scientific and engineering principles in the graduates' approach to professional work, and an understanding of the ethical and social dimensions of such work. • Cover understanding and knowledge in both high-level architectural concepts and low-level implementation techniques, and both software and hardware systems. Graduates will have experience of the current state of the art of ES-IoT and will have demonstrated the ability to apply the principles and practices in tackling a significant technical problem; the solution typically demonstrates a soundly based vision of the direction of developments within ES-IoT field. • Provide a good knowledge and practical experience of up to date tools and techniques related to the enabling technologies of ES-IoT. Graduates will be able to critically evaluate and test the embedded components, machine-to-machine networks and interconnected systems forming an application. They are expected to go on to employment in technical positions with ES-IoT related supplier industries and large-scale users; some graduates will pursue research careers. • The programme aims to meet the descriptors, for a qualification at Masters (M) level, published by the Framework for Higher Education Qualifications in England, Wales and Northern Ireland	

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge, understanding, skills and other attributes associated with the theme of Automation and Control.

On completing the programme students should have gained and be able to demonstrate the following AHEP4 Learning Outcomes:

M1. Apply comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex 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.

M2. Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgement to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed.

M3. Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.

M4. Select and critically evaluate technical literature and other sources of information to solve complex problems.

M5. Design solutions for complex 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 and safety, diversity, inclusion, cultural, societal environmental and commercial matter, codes of practice and industry standards.

M7. Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life cycle of a product or process) and minimise adverse impacts.

M16. Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.

M17. Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.

AHEP Learning outcomes M6, M8, M9, M10, M11, M12, M13, M14, M15 and M18 are achieved at previous level of study.

Teaching and Learning Methods

Lectures are the main way of imparting knowledge and understanding. Practical classes feature prominently, which enhance understanding of hardware and programming. Students are expected to contribute to their own learning experience by independent study. They are provided with references to books which are categorised as *essential*, *recommended*, and *background* reading, as well as scientific papers and other learning materials including appropriate web URLs.

Most modules involve coursework and/or practicals, much of which involves problem solving skills. This is especially so in the group and individual projects where students need to select, evaluate and apply appropriate tools and techniques. Here and elsewhere students will need to investigate possible alternatives in the technical and professional literature, and to reason about computer systems.

Key skills feature throughout the programme; teamwork in the group projects; oral presentation, interpersonal communication, and planning and organisation in the individual project module, as well as the group projects; written communication in all modules, but especially in the individual project; problem solving, initiative and adaptability are necessarily covered throughout the programme .

The strategy of the degree programme is to give a broad coverage of the subject of Embedded Systems and Internet of Things in taught modules, and then to provide specialisation in the individual project.

Assessment Strategy

Formative assessment in particular areas occurs through tutorial exercises (computer based and written) and coursework. The primary means of assessing factual knowledge is through closed book written examination. This is supported through assessed coursework and case studies.

In depth individual learning forms part of the research project, which is assessed by a literature survey, a presentation exercise, dissertation and oral examination.

Intellectual abilities are assessed through a mixture of written examinations, coursework assignments. The research project, which is assessed by dissertation and oral examination, provides evidence of the ability to carry out a research project.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The Programme is aimed at the award of MSc degree upon successful completion of all taught modules and the Individual Project.

This is a one year Programme, which starts in September and the students normally complete the last assignment by the end of August. The taught part of the programme takes place from September to June. The Programme has 180 credits.

There are three modules in semester one with 60 total credits and three modules in semester two with 60 total credits. The project (60 credits) takes place in semesters 2 and 3, 10 credits in semester 2 and 50 credits in semester 3.

Key features of the programme (including what makes the programme distinctive)

The MPC Degree Programme includes only the full-time mode of studies and is normally completed within one year. This is an advanced programme with a strong emphasis on

project work and self-directed learning. None of the material is taught at the undergraduate level.

A unique feature of this Programme is that it combines the subjects normally attributed to electronic design, networking and software engineering. Such a wide coverage reinforced with skills developed in the coursework and the Individual Project creates specialists capable to merge into a commercial design group with reduced in-house training. Relevance of this Degree Programme to the needs of modern industry is extremely high.

The optional modules add flexibility to the programme, catering to the needs of the engineers either in the field of hardware or software/system-level wireless embedded design.

The Programme combines leading research and teaching expertise in mobile communications and distributed computing from the School. The School is equipped with teaching and research facilities to deliver a high quality programme in this new multidisciplinary field. Large, state of the art teaching laboratories provide an opportunity for the next generation of technology and computing specialists to be educated using the latest ideas in interactive instruction. The course is delivered by staff from internationally recognised research groups with active projects in the relevant fields.

Programme regulations (link to on-line version)

[-R5134F.pdf](#)

13 Support for Student Learning

Generic information regarding University provision is available at the following link.

[Generic Information](#)

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14 Methods for evaluating and improving the quality and standards of teaching and learning

Generic information regarding University provision is available at the following link.

[Generic Information](#)

Accreditation reports

Institute of Engineering Technology 5134F Only

Additional mechanisms

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

[Generic Information](#)

In addition, information relating to the programme is provided in:

The University Prospectus: <http://www.ncl.ac.uk/postgraduate/courses/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/>

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided.