

Please select a School

Title of Programme: MSc Modular Masters in Electronics

Programme Code: EIMASTE

# Programme Specification

This programme specification is relevant to students entering:  
01 September 2023

Associate Dean of School (Academic Quality Assurance):  
Mariana Lilley



A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

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## Summary of amendments to the programme

Date	Section	Amendment
23.03.23	D	Part-time entry no longer supported.

If you have any queries regarding the changes please email [AQO@herts.ac.uk](mailto:AQO@herts.ac.uk)

# Programme Specification MSc Modular Masters in Electronics

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical 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 teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

## Section 1

<b>Awarding Institution/Body</b>	University of Hertfordshire
<b>Teaching Institution</b>	University of Hertfordshire
<b>University/partner campuses</b>	College Lane
<b>Programme accredited by</b>	Institution of Engineering and Technology (IET)
<b>Final Award (Qualification)</b>	MSc
<b>All Final Award titles</b>	MSc Communications and Information Engineering
<b>(Qualification and Subject)</b>	MSc Electronics Engineering MSc Power Electronics and Control
<b>FHEQ level of award</b>	7

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### A. Programme Rationale

This programme consists of three Masters awards with an expectation that students will have studied a related engineering discipline to a Bachelor's level or equivalent, as opposed to a "conversion" masters' philosophy aimed at students from a non-engineering background. The MSc awards can be studied over three semesters with the final semester being a 60 credit point individual project. The MSc has two starting points in semester A and B with options to take an 'early start' for the project over Semester C or to extend and take the project in the next opportunity in Semester A as the final third semester.

This structure has been adopted to meet the demand from international students whose previous studies were conducted with a different academic year to the normal September to September year operated in the UK. The consequence of this is that the modules that make up the MSc curriculum need to be independent of each other as the two intake groups of students will not necessarily take modules in the same order. Students entering in Semester B will therefore complete their studies over an 18-month period rather than 12 months.

The **Communications and Information Engineering** course enables students to understand the fundamentals of information theory and apply appropriate performance and quality measures to engineer enhanced data communication systems. A communications engineer is responsible for the research, design, development and production of communications equipment/systems. Communications engineering encompasses modes of communication such as satellites, radio, internet and broadband technologies and wireless telephone services. Defence industries, consultancy and communication support companies recruit with this qualification.

For **Electronics Engineering** students, this programme enables student to develop knowledge and skills in a broad range of Electronics Engineering areas, such as the seamless integration of software and hardware for sustainable and smart applications using Microprocessor/DSP/FPGA technology. You can find work in a variety of areas including acoustics, defence, nanotechnology, radio and satellite communication and robotics. Industry sectors that recruit this type of qualification include the automotive electronics sector, defence, hardware design and consulting.

For **Power and Electronic Control students**, this programme has emphasis on advanced power electronics and drives, and advanced power systems. Exciting new developments such as wide band gap electronics, energy harvesting and solar cells are discussed and recent developments in power electronics are highlighted. Notable companies recruit with this qualification such as Siemens and defence companies such as Lockheed Martin.

On the **MSc in Communications and Information Engineering**, the development of skills and advancement of knowledge focus on:

- Enabling students to understand the fundamentals of information theory and apply appropriate performance and quality measures to engineer enhanced data communication systems;
- Enabling students to design state-of-the-art networks using legacy as well as emerging optical and wireless technologies;
- Developing the students' ability to define and apply appropriate analytic, algorithmic and a mix of simulation and hardware tools for reliable data transfer.
- Developing in students' skills to critically evaluate new developments in technology, carry out independent research and coordinate project activities.

On the **MSc in Electronics Engineering**, the development of skills and advancement of knowledge focus on:

- developing in-depth knowledge and understanding of a broad range of Electronics Engineering expertise;
- building strong design skills for the seamless integration of software and hardware for sustainable and smart applications using Microprocessor/DSP/FPGA technology;
- introducing students to the recent advances in embedded intelligent systems with coverage of artificial intelligence, sustainability and smart system engineering;
- Developing in students' skills to critically evaluate new developments in technology, carry out independent research and coordinate project activities.

On the **MSc in Power Electronics and Control**, the development of skills and advancement of knowledge focus on:

- Enabling students to solve multidisciplinary problems related to energy conversion, renewable energy systems integration and energy efficiency;
- Developing in students practical skills for the analysis, design and application of power conversion systems in key areas of industry;
- Developing in students' skills to critically evaluate new developments in technology, carry out independent research and coordinate project activities.

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## B. Educational Aims of the Programme

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

**Additionally this programme aims to:**

- provide a quality education at postgraduate level in disciplines associated with electronics;
- provide an educational opportunity and experience to graduates and/or those with appropriate previous experience which enhances their prospects of professional employment in industry;
- provide a variety of awards of study through which the postgraduate may demonstrate competence, knowledge, skills and understanding, in and of, selected disciplines in the field of electronic engineering;
- provide the students with the knowledge and understanding to equip them for a career in technical and engineering management;
- provide and equip the students with theory and the practice of process and technology management, system design and implementation.

## C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014), and relate to the typical student.

Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2021) have been used as a guiding framework for curriculum design.

Knowledge and Understanding:	Teaching/learning methods & strategies	Assessment
<p><b>All awards</b></p> <p><b>A2.</b> Demonstrate knowledge and understanding of the product/process definition and system design process.</p> <p><b>A5.</b> Demonstrate knowledge and understanding of suitable application areas in which advanced digital hardware and algorithms can be deployed to produce effective systems.</p> <p><b>A7.</b> Demonstrate knowledge and understanding of business practice and the limitations within an engineering specialisation.</p> <p><b>A8.</b> Demonstrate knowledge and understanding of the roles in an engineering team and personal responsibilities.</p> <p><b>For Communications and Information Engineering (CIE)</b></p> <p><b>A1(CIE).</b> Demonstrate knowledge and understanding of the advanced theoretical issues and their practical implementations that underlie recent developments in Communications and Information Engineering.</p> <p><b>A3(CIE).</b> Demonstrate knowledge and understanding of a range of hardware components and architectures that are used in modern systems appropriate to Communications and Information Engineering.</p> <p><b>A4(CIE).</b> Demonstrate knowledge and understanding of a range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to</p>	<p>Acquisition of knowledge and understanding is through a combination of lectures, seminars, group discussions and assignments.</p> <p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	<p>Knowledge and understanding are assessed through a series of case studies, assignments, project reports and unseen examinations</p>

Communications and Information Engineering.

**A6(CIE).** Demonstrate knowledge and understanding of the physical principles underlying the design of the hardware components used in optical systems.

**For Electronics Engineering (EE)**

**A1(EE).** Demonstrate knowledge and understanding of the advanced theoretical issues and their practical implementations that underlie recent developments in Electronics Engineering.

**A3(EE).** Demonstrate knowledge and understanding of the application of a range of software and hardware that are used in modern smart, sustainable systems.

**A4(EE).** Demonstrate knowledge and understanding of a range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to electronics engineering.

**For Power Electronics and Control (PEC)**

**A1(PEC).** Demonstrate knowledge and understanding of the advanced theoretical issues and their practical implementations that underlie recent developments in Power Electronics and Control.

**A3(PEC).** Demonstrate knowledge and understanding of a range of hardware components and architectures that are used in modern systems appropriate to Power Electronics and Control.

**A4(PEC).** Demonstrate knowledge and understanding of a range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to Power Electronics and Control.

Intellectual skills:	Teaching/learning methods & strategies	Assessment
<p><b>All awards</b></p> <p><b>B1.</b> Plan and carry out a significant piece of independent investigative or development work as part of their project.</p> <p><b>B6.</b> Develop skills in ethical operations and show insight on the commercial and social context.</p> <p><b>For Communications and Information Engineering</b></p> <p><b>B3(CIE).</b> Select appropriate hardware components and platforms for use in systems appropriate to Communications and Information Engineering.</p> <p><b>B4(CIE).</b> Design systems appropriate to Communications and Information Engineering by selecting appropriate equipment, configurations, protocols and algorithms.</p> <p><b>B5(CIE).</b> Evaluate the performance of systems appropriate to Communications and Information Engineering by theoretical analysis and/or simulation.</p> <p><b>For Electronics Engineering</b></p> <p><b>B2(EE).</b> Evaluate, select and deploy appropriate software tools to create/manage or simulate applications/systems.</p> <p><b>B3(EE).</b> Select appropriate embedded systems using artificial intelligence and smart systems.</p> <p><b>For Power Electronics and Control</b></p> <p><b>B2(PEC).</b> Evaluate, select and deploy appropriate software tools to create/manage or simulate applications/systems appropriate to Power Electronics and Control.</p>	<p>Intellectual skills are developed throughout the programme by the methods and strategies outlined in section A, above.</p> <p>Throughout, the learner is encouraged to further develop intellectual skills by guided and independent study.</p> <p>Analysis, problem solving and modelling skills are further developed through case studies, class discussion, in-course exercises, assignments and exams.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study</p>	<p>Intellectual skills are assessed through case studies, experiential work, tutorials, assignment and examinations. These are supported by work centred on analysis and synthesis, problem solving, in a technical context.</p>

<p><b>B3(PEC).</b> Select appropriate hardware components and platforms for use in systems appropriate to Power Electronics and Control.</p> <p><b>B4(PEC).</b> Design systems appropriate to Power Electronics and Control by selecting appropriate equipment, configurations, protocols and algorithms.</p> <p><b>B5(PEC).</b> Evaluate electronic control application areas in which advanced digital hardware and algorithms can be deployed to produce effective systems.</p>		
<b>Practical skills:</b>	<b>Teaching/learning methods &amp; strategies</b>	<b>Assessment</b>
<p><b>C1.</b> Apply appropriate analytical and modelling techniques to electronic engineering problems.</p> <p><b>C2.</b> Perform experimental laboratory work and draw conclusions.</p> <p><b>C3.</b> Use computer-based engineering tools.</p> <p><b>C4.</b> Prepare technical documentation.</p> <p><b>C5.</b> Evaluate appropriate systems, components or processes.</p> <p><b>C6.</b> Plan and manage a project, taking into account economic, social, legal, ethical and sustainability constraints and business strategy.</p>	<p>Practical skills are developed throughout the programme by the methods and strategies outlined in sections A and B above.</p> <p>C1 is developed through laboratory work, coursework assignments and tutorial work.</p> <p>C2 and C5 are developed through laboratory work.</p> <p>C3 is developed through the use of software simulation tools at all levels.</p> <p>C4 is developed through project work, lab exercises and software documentation.</p> <p>C6 is developed through lectures and project work.</p> <p>Feedback is given to all students on all summative work produced.</p>	<p>Practical skills C1-C6 are formally assessed through assignment work on case studies and the individual project.</p>
<b>Transferable skills:</b>	<b>Teaching/learning methods &amp; strategies</b>	<b>Assessment</b>
<p><b>D1.</b> Communicate information effectively, orally and/or in writing.</p> <p><b>D2.</b> Manage time and resources effectively.</p> <p><b>D3.</b> Carry out independent investigations to determine the state of knowledge and research in a subject area.</p>	<p>Transferable skills are developed throughout the programme by using group discussions and report writing and require students to manage their own time for achieving targets.</p> <p>D1 and D2 developed through group work, coursework reports, oral presentations and the project report.</p>	<p>Transferable skills D1-D6 are assessed through assignment work and the project.</p>

**D4.** Work effectively individually and/or within a team.

**D5.** Make effective use of a wide range of information resources, such as those offered to them by the university.

**D6.** Progress to research work, or work at an advanced level within an academic or commercial setting.

D3 – D6 are developed throughout most modules; through lectures, group work, assessments and the individual project.

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## D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in full-time mode only.

Full-time students may enter the programme for a Semester A entry option 1 start in September when it runs over one calendar year or Semester A entry option 2 when it will run for a period of 18 months. Semester B entry in January runs over 18 months. Identical modules will be studied on both September and January intakes. Students on the September and January intakes complete their projects in Semesters C, A or B respectively:

- Semester A Entry Option 1 is to include an early start project module in a study pattern of A, B then C.
- Semester A Entry Option 2 is to select a longer study time in a study pattern of A, B then A.
- Semester B Entry study time is a pattern B, A then B.

Entry is normally at Masters Level 7 with related degree qualifications.

Accreditation of prior learning (APEL/APCL) is available for this programme. Students wishing to claim APL must document their relevant prior learning in detail and must provide full evidence for their prior achievement of the learning outcomes of this programme.

The Programme Learning Outcomes detailed in section C are developed and assessed through the constituent modules. Table 2 (at the end of this document) identifies where each learning outcome is developed and assessed.

### Professional and Statutory Regulatory Bodies

The MSc Communications and Information Engineering is accredited by the Institution of Engineering and Technology (IET) as meeting the requirements for Partial CEng (Further Learning) for the 2017 intake to the 2024 intake.

The MSc Electronics Engineering is accredited by the Institution of Engineering and Technology (IET) as meeting the requirements for Partial CEng (Further Learning) for the 2019 intake to the 2024 intake.

The MSc Power Electronics and Control is accredited by the Institution of Engineering and Technology (IET) as meeting the requirements for Partial CEng (Further Learning) for the 2016 intake to the 2024 intake.

In line with the Washington Accord recognition, the awards above require a combination of a recognised CEng bachelors-level degree course with recognised further learning to masters level.

### Work-Based Learning, including Sandwich Programmes

N/A

### Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the award. Any



interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

**Table 1a Outline Programme Structure**

**MSc Communications and Information Engineering**

**Mode of study** Full-time

**Entry point** Semester A

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Digital Mobile Communication Systems	7ENT1054	15	60	40	0	A
Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
Optical Communication Technologies	7ENT1012	15	60	40	0	B
Information Theory and Data Processing	7ENT1105	15	60	40	0	B
Broadband Networks and Data Communications	7ENT1050	15	60	40	0	B
Biometrics Systems and Speech Processing	7ENT1119	15	60	40	0	B
MSc Individual Projects (E)	7ENT1110	60	0	100	0	C or A

The award of an MSc requires 180 credit points passed at level 7, including the Masters project.

## Table 1a Outline Programme Structure

### MSc Communications and Information Engineering

Mode of study Full-time

Entry point Semester B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
<b>Compulsory Modules</b>						
Module Title						
Optical Communication Technologies	7ENT1012	15	60	40	0	B
Information Theory and Data Processing	7ENT1105	15	60	40	0	B
Broadband Networks and Data Communications	7ENT1050	15	60	40	0	B
Biometrics Systems and Speech Processing	7ENT1119	15	60	40	0	B
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Digital Mobile Communication Systems	7ENT1054	15	60	40	0	A
Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
MSc Individual Projects (E)	7ENT1110	60	0	100	0	B

The award of an MSc requires 180 credit points passed at level 7, including the Masters project.

## Table 1a Outline Programme Structure

### MSc Electronics Engineering

**Mode of study** Full-time

**Entry point** Semester A

Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
<b>Compulsory Modules</b>						
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Digital Mobile Communication Systems	7ENT1054	15	60	40	0	A
Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
Smart Embedded Systems Engineering	7ENT1112	15	60	40	0	B
Embedded Control Systems	7ENT1042	15	0	100	0	B
Mixed mode and VLSI Technologies	7ENT1008	15	60	40	0	B
Artificial Intelligence	7ENT1116	15	60	40	0	B
MSc Individual Projects (E)	7ENT1110	60	0	100	0	C or A

### MSc Electronics Engineering

**Mode of study** Full-time

**Entry point** Semester B

Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
<b>Compulsory Modules</b>						
Smart Embedded Systems Engineering	7ENT1112	15	60	40	0	B
Embedded Control Systems	7ENT1042	15	0	100	0	B
Mixed mode and VLSI Technologies	7ENT1008	15	60	40	0	B
Artificial Intelligence	7ENT1116	15	60	40	0	B
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Digital Mobile Communication Systems	7ENT1054	15	60	40	0	A

Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
MSc Individual Projects (E)	7ENT1110	60	0	100	0	B

The award of an MSc requires 180 credit points passed at level 7, including the Masters project.

### Table 1a Outline Programme Structure

#### MSc Power Electronics and Control

Mode of study Full-time

Entry point Semester A

Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
<b>Compulsory Modules</b>						
Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Advanced Power Electronics and Control	7ENT1051	15	60	40	0	A
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
Embedded Control Systems	7ENT1042	15	0	100	0	B
Information Theory and Data Processing	7ENT1105	15	60	40	0	B
Artificial Intelligence	7ENT1116	15	60	40	0	B
Renewable Energy Systems and Smart Grid Technologies	7ENT1120	15	0	100	0	B
MSc Individual Projects (E)	7ENT1110	60	0	100	0	C or A

## MSc Power Electronics and Control

Mode of study Full-time

Entry point Semester B

Compulsory Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Embedded Control Systems	7ENT1042	15	0	100	0	B
Information Theory and Data Processing	7ENT1105	15	60	40	0	B
Artificial Intelligence	7ENT1116	15	60	40	0	B
Renewable Energy Systems and Smart Grid Technologies	7ENT1120	15	0	100	0	B
Advanced Reconfigurable Systems & Applications	7ENT1003	15	60	40	0	A
Advanced Power Electronics and Control	7ENT1051	15	60	40	0	A
Digital Signal Processing and Applications	7ENT1113	15	60	40	0	A
Sustainable Business of Electronics	7ENT2004	15	0	100	0	A
MSc Individual Projects (E)	7ENT1110	60	0	100	0	B

The award of an MSc requires 180 credit points passed at level 7, including the Masters project.

### Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of:	Programme Learning Outcomes developed (see above)
MSc	Communications and Information Engineering	180 credit points, including a pass in MSc Individual Projects (E) 7ENT1110.	3 Semesters	All programme learning outcomes for the award (see Table 2).
MSc	Electronics Engineering			
MSc	Power Electronics and Control			
Interim Award	Award Title	Minimum requirements	Available at end of:	Programme Learning Outcomes developed (see above)
Postgraduate Diploma	Communications and Information Engineering	120 credit points, including at least 90 at level 7	2, 3 Semesters	A subset of the programme learning outcomes (see Table 2) depending on the student's individual modules passed.
Postgraduate Diploma	Electronics Engineering			

Postgraduate Diploma	Power Electronics and Control			
Postgraduate Certificate		60 credit points, including at least 45 at level 7	1-2 Semesters	See UPR AS11, section 13: <a href="http://sitem.herts.ac.uk/secreg/upr/AS11.htm">http://sitem.herts.ac.uk/secreg/upr/AS11.htm</a>

Masters and Diploma awards can be made "with Distinction" or "with Commendation" where criteria as described in [UPR AS14](#), Section D are met.

## Programme-specific assessment regulations

The programme is compliant with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12](#) and [UPR AS14](#)) with the exception of those listed below, which have been specifically approved by the University:

For all awards:

- A compensated pass cannot be awarded for the individual project, 7ENT1110 MSc Individual Project (E).
- To comply with professional body regulations students must achieve, after all available attempts under the University regulations, a minimum of 40% (in any allowable attempt) at level 7, before the board of examiners will be able to consider compensation.
- Maximum permissible compensation is 15 credits as per requirements of Professional Bodies.

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
EIMASTECI	CIEMJAN1F-2 CIEMSEP1F-1 CIEMA2F	MSc Communications and Information Engineering	7ENT1110 MSc Individual Project (E)	yes
EIMASTEET	EMJAN2F EMSEP1F-1 EMA2F	MSc Electronics Engineering	7ENT1110 MSc Individual Project (E)	yes
EIMASTEPE	PECMJAN1F-2 PECMSEP1F-1 PECMA2F	MSc Power Electronics and Control	7ENT1110 MSc Individual Project (E)	yes

## E. Management of Programme & Support for student learning

### Management

The programme is managed and administered through:

- Dean of School;
- Associate Dean (Academic Quality Assurance);
- Associate Dean (Learning, Teaching and Student Experience);
- A Programme Leader, who has overall responsibility for the effective operationalization of the programme, and ensuring that academic standards are maintained and an effective student learning experience is provided;
- An Admissions Tutor, with specific responsibility for selection;
- Module Leaders who are responsible for individual modules;

- A programme committee, chaired by the Programme Leader that includes student representation;
- A designated administrative team to deal with day-to-day administration associated with the modules within the programme.

## **Support**

Students are supported by:

- An induction week at the beginning of each new academic session;
- Overseas Orientation;
- You will have a Personal Tutor who will be an important point of contact, able to help you gain a good understanding of the School and programme you are studying;
- A project supervisor;
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, and international student support;
- Office of Dean of Students, Student Wellbeing (incorporating Counselling, Mental Health and Disability Support), Chaplaincy, and Day Nursery;
- A versatile on-line inter-active intranet and learning environment;
- Guided student-centred learning on Canvas module sites;
- Access to extensive digital and print collections of information resources;
- Attractive modern study environments in 2 Learning Resources Centres;
- Student Success Hubs, which include a Mathematics Drop-in Centre;
- Medical Centre;
- University Disability Advisors;
- An Equality Office;
- Careers Enterprise and Employment Services;
- Hertfordshire Student's Union;
- Dedicated programme site.

## **F. Other sources of information**

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A Programme (or Student) Handbook;
- A Definitive Module Document (DMD) for each constituent module;

The [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: <http://www.herts.ac.uk/secreg/upr/>. In particular, [UPR SA07](#) 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>.

## **G. Entry requirements**

For current entry tariff point requirements, please refer to the relevant page for the Course on the University website or on the online prospectus.

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

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If you would like this information in an alternative format please contact:  
Hutton Hub Services Administration Service: [hhaq@herts.ac.uk](mailto:hhaq@herts.ac.uk)

If you wish to receive a copy of the latest External Examiner's Report for the programme, please email a request to [aqo@herts.ac.uk](mailto:aqo@herts.ac.uk)



## MSc in Communication and Information Engineering

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

Module Title		Programme Learning Outcomes (as identified in section 1 and the following page)																								
		Knowledge & Understanding								Intellectual Skills						Practical Skills						Transferable Skills				
		A1 CIE	A2	A3 CIE	A4 CIE	A5	A6 CIE	A7	A8	B1	B3 CIE	B4 CIE	B5 CIE	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6
Level 7	Data Signal Processing and Applications	7ENT1113	X		X		X						X			X	X	X		X		X		X		
	Digital Mobile Communication Systems	7ENT1054	X		X	X			X		X	X	X		X	X	X		X		X		X		X	
	Advanced Reconfigurable Systems & Applications	7ENT1003	X			X					X				X	X	X		X		X		X		X	
	Sustainable Business of Electronics	7ENT2004		X					X	X				X			X	X		X	X	X	X	X	X	
	Biometrics Systems and Speech Processing	7ENT1119	X			X						X		X	X	X	X		X		X		X		X	
	Broadband Networks and Data Communications	7ENT1050	X			X		X		X			X	X		X	X	X		X		X		X		
	Information Theory and Data Processing	7ENT1105	X			X					X	X			X	X	X		X		X		X		X	
	Optical Communication Technologies	7ENT1012	X			X		X				X	X		X	X	X		X		X		X		X	
	MSc Individual Project (E)	7ENT1110	X							X					X	X	X	X	X	X	X	X	X	X	X	

## KEY TO PROGRAMME LEARNING OUTCOMES FOR COMMUNICATION AND INFORMATION ENGINEERING

### Knowledge and Understanding

- A1(CIE) The advanced theoretical issues and their practical implementations that underlie recent developments in Communications and Information Engineering.
- A2 The product/process definition and system design process.
- A3(CIE) A range of hardware components and architectures that are used in modern systems appropriate to Communications and Information Engineering.
- A4cie A range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to Communications and Information Engineering.
- A5 Suitable application areas in which advanced digital hardware and algorithms can be deployed to produce effective systems.
- A6(CIE) The physical principles underlying the design of the hardware components used in optical systems.
- A7 Understanding of business practice and the limitations within an engineering specialisation
- A8 Understand the roles in an engineering team and personal responsibilities

### Intellectual Skills

- B1 Plan and carry out a significant piece of independent investigative or development work as part of their project.
- B3(CIE) Select appropriate hardware components and platforms for use in systems
- B4(CIE) Design systems by selecting appropriate equipment, configurations, protocols and algorithms.
- B5(CIE) Evaluate the performance of systems by theoretical analysis and/or simulation.
- B6 Develop skills in ethical operations and show insight on the commercial and social context.

### Practical Skills

- C1 Apply appropriate analytical and modelling techniques to electronics engineering problems.
- C2 Perform experimental laboratory work and draw conclusions.
- C3 Use computer-based engineering tools.
- C4 Prepare technical documentation.
- C5 Evaluate appropriate systems, components or processes.
- C6 Plan and manage a project, taking into account economic, social, legal, ethical and sustainability constraints and business strategy.

### Transferable Skills

- D1 Communicate information effectively, orally and/or in writing.
- D2 Manage time and resources effectively.
- D3 Carry out independent investigations to determine the state of knowledge and research in a subject area.
- D4 Work effectively individually and/or within a team
- D5 Make effective use of a wide range of information resources, such as those offered to them by the university.
- D6 Progress to research work, or work at an advanced level within an academic or commercial setting.

# MSc Electronics Engineering

		Programme Learning Outcomes (as identified in section 1 and the following page)																							
		Knowledge & Understanding							Intellectual Skills				Practical Skills						Transferable Skills						
Module Title	Module Code	A1 EE	A2	A3 EE	A4 EE	A5	A7	A8	B1	B2 EE	B3 EE	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6	
Digital Signal Processing and Applications	7ENT1113	X		X		X				X	X		X	X	X		X		X		X		X		
Advanced Reconfigurable Systems and Applications	7ENT1003	X		X	X					X			X	X	X		X		X		X		X		
Digital Mobile Communication Systems	7ENT1054	X		X		X				X			X	X	X		X		X		X		X		
Sustainable Business of Electronics	7ENT2004		X				X	X				X			X	X		X	X	X	X	X	X		
Embedded Control Systems	7ENT1042		X	X	X	X				X	X			X	X	X	X		X	X					
Smart Embedded Systems Engineering	7ENT1112	X									X		X	X	X		X		X		X		X		
Artificial Intelligence	7ENT1116	X			X	X				X	X		X	X	X		X		X		X		X		
Mixed Mode and VLSI Technologies	7ENT1008	X		X							X		X	X	X		X		X		X		X		
MSc Individual Project (E)	7ENT1110	X							X				X	X	X	X	X	X	X	X	X	X	X	X	

Level 7

## KEY TO PROGRAMME LEARNING OUTCOMES FOR ELECTRONICS ENGINEERING

### Knowledge and Understanding e.g.

- A1(E) The advanced theoretical issues and their practical implementations that underlie recent developments in Electronics Engineering.
- A2 The product/process definition and system design process.
- A3(E) Application of a range of software and hardware that are used in modern smart, sustainable systems
- A4(E) A range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to electronics engineering.
- A5 Suitable application areas in which advanced digital hardware and algorithms can be deployed to produce effective systems.
- A7 Understanding of business practice and the limitations within an engineering specialisation
- A8 Understand the roles in an engineering team and personal responsibilities

### Intellectual Skills e.g.

- B1 Plan and carry out a significant piece of independent investigative or development work as part of their project.
- B2(E) Evaluate, select and deploy appropriate software tools to create/manage or simulate applications/systems
- B3(E) Select appropriate embedded systems using artificial intelligence and smart systems
- B6 Develop skills in ethical operations and show insight on the commercial and social context.

### Practical Skills

- C1 Apply appropriate analytical and modelling techniques to electronics engineering problems.
- C2 Perform experimental laboratory work and draw conclusions.
- C3 Use computer-based engineering tools.
- C4 Prepare technical documentation.
- C5 Evaluate appropriate systems, components or processes.
- C6 Plan and manage a project, taking into account economic, social, legal, ethical and sustainability constraints and business strategy.

### Transferable Skills

- D1 Communicate information effectively, orally and/or in writing.
- D2 Manage time and resources effectively.
- D3 Carry out independent investigations to determine the state of knowledge and research in a subject area.
- D4 Work effectively individually and/or within a team
- D5 Make effective use of a wide range of information resources, such as those offered to them by the university.
- D6 Progress to research work, or work at an advanced level within an academic or commercial setting.

## MSc Power Electronics and Control

Programme Learning Outcomes (as identified in section 1 and the following page)																											
		Knowledge & Understanding								Intellectual Skills						Practical Skills						Transferable Skills					
	Module Title	Module Code	A1 PEC	A2	A3 PEC	A4 PEC	A5	A7	A8	B1	B2 PEC	B3 PE C	B4 PEC	B5 PE C	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6
Level 7	Digital Signal Processing and Applications	7ENT1113	X		X	X	X					X	X			X	X	X		X		X		X		X	
	Advanced Reconfigurable Systems & Applications	7ENT1003	X			X							X			X	X	X		X		X		X		X	
	Advanced Power Electronics and Control	7ENT1051	X	X	X							X	X	X		X	X			X							
	Information Theory and Data Processing	7ENT1105	X			X						X	X			X	X	X		X		X		X		X	
	Sustainable Business of Electronics	7ENT2004		X				X	X						X			X	X		X	X	X	X	X	X	
	Embedded Control Systems	7ENT1042		X	X	X	X					X	X	X	X			X	X	X	X		X	X			
	Artificial Intelligence	7ENT1116	X			X	X						X				X	X	X		X		X		X		X
	Renewable Energy Systems and Smart Grid Technologies	7ENT1120	X	X	X	X				X			X				X				X			X		X	X
	MSc Individual Projects (E)	7ENT1110	X							X						X	X	X	X	X	X	X	X	X	X	X	X

## KEY TO PROGRAMME LEARNING OUTCOMES FOR POWER ELECTRONICS AND CONTROL

### Knowledge and Understanding

- A1(PEC) The advanced theoretical issues and their practical implementations that underlie recent developments in Power Electronics and Control.
- A2 The product/process definition and system design process.
- A3(PEC) A range of hardware components and architectures that are used in modern systems appropriate to Power Electronics and Control.
- A4(PEC) A range of algorithms and/or protocols and their strengths and weaknesses that are suitable for designing systems appropriate to Power Electronics and Control.
- A5(PEC) Electronic control application areas in which advanced digital hardware and algorithms can be deployed to produce effective systems.
- A7 Understanding of business practice and the limitations within an engineering specialisation
- A8 Understand the roles in an engineering team and personal responsibilities

### Intellectual Skills

- B1 Plan and carry out a significant piece of independent investigative or development work as part of their project.
- B2(PEC) Evaluate, select and deploy appropriate software tools to create/manage or simulate applications/systems appropriate to Power Electronics and Control.
- B3(PEC) Select appropriate hardware components and platforms for use in systems appropriate to Power Electronics and Control
- B4(PEC) Design systems appropriate to Power Electronics and Control by selecting appropriate equipment, configurations, protocols and algorithms.
- B5(PEC) Evaluate the performance of systems appropriate to Power Electronics and Control by theoretical analysis and/or simulation.
- B6 Develop skills in ethical operations and show insight on the commercial and social context.

### Practical Skills

- C1 Apply appropriate analytical and modelling techniques to electronics engineering problems.
- C2 Perform experimental laboratory work and draw conclusions.
- C3 Use computer-based engineering tools.
- C4 Prepare technical documentation.
- C5 Evaluate appropriate systems, components or processes.
- C6 Plan and manage a project, taking into account economic, social, legal, ethical and sustainability constraints and business strategy.

### Transferable Skills

- D1 Communicate information effectively, orally and/or in writing.
- D2 Manage time and resources effectively.
- D3 Carry out independent investigations to determine the state of knowledge and research in a subject area.
- D4 Work effectively individually and/or within a team
- D5 Make effective use of a wide range of information resources, such as those offered to them by the university.
- D6 Progress to research work, or work at an advanced level within an academic or commercial setting.

## Section 2

### Programme management

<b>Relevant QAA subject benchmarking statements</b>	Engineering
<b>Type of programme</b>	Taught postgraduate
<b>Date of validation/last periodic review</b>	February 19
<b>Date of production/ last revision of PS</b>	<b>March 2022</b>
<b>Relevant to level/cohort</b>	Level 7 entering September 2023
<b>Administrative School</b>	School of Physics, Engineering & Computer Science
<b>Language of Delivery</b>	English

**Table 3 Course structure**

Course details			
Course Code	Course Description	HECOS	UCAS
EIMASTECI	MSc Communications and Information Engineering	100159	N/A
EIMASTEET	MSc Electronics Engineering	100165	N/A
EIMASTEPE	MSc Power Electronics and Control	100164	N/A