

Programme Specification amendment notification

Title of Programme: Engineering Degree Apprenticeship (Electronics)
BEng Honours in Electrical & Electronic Engineering

Programme Code: ENDAEE

As a result of the ongoing Coronavirus pandemic, the University has been required to make some revisions to this programme for the 2020/21 academic session, affecting sections C and/or D of this Programme Specification. These amendments are as follows:

Section	Amendment
D. Programme Structures, Features, Levels, Modules, and Credits	Unseen written examinations will not be returning for the semester A which typically runs from September to January each academic year. Use of alternative methods such as Online Timed Assessments and quizzes that incorporate several features to create valid assessments. There will be practice quizzes through the module prior to any assessment using the Canvas quiz.
	The School has revised the assessment structure where unseen examinations and practical sessions were key sections of the assessment. The practical sessions will still take place but not be mandatory in the assessment for the final grade in order to protect any student as a result of national Covid guidelines e.g. lockdown and self-isolation. The modules show AW which means there has been a change to Assessment Weighting where weighting is the percentage amount of the assessment, whether coursework or exam or practical, contributes to the overall grade of the module. CS means there has been a Change to the Semester the module is being taught on due to other issues.
	The table below shows the structure for the modules in Semester A 2020 2021 at all levels 4, 5 ,6 and 7 where appropriate. Table 1a in the Programme Specification module assessment structure will be replaced where applicable with the structures shown below for the affected AW and CS modules.

Level 4 2020 2021

2020-21 Programmes	Module Title	Module Code	Coursework %	Exam %	Practical %	Semester	Credit Points	DMD Change: AW = assessment weighting CS = Change Semester
ENDAEE	Engineering Mathematics	4PAM1007	100	0	0	A	15	AW
ENDAEE	Digital Electronics & Computer Organisation*	4ELE0050	100	0	0	A	15	AW

Associate Dean of School (Academic Quality Assurance):

Signature



School of Physics, Engineering and Computer Science

Title of Programme: Engineering Degree Apprenticeship (Electronics)

Programme Code: ENDAEE

Programme Specification

This programme specification is relevant to students entering:
21 September 2020

Associate Dean of School (Academic Quality Assurance):
Susan Murray



Signature

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.

Summary of amendments to the programme:

A	Revised rationale
D	Revised professional practice modules
D	Note with respect to interim awards
Appendix 5	Global awareness added to Graduate Attributes
All	Change of School name.
All	Removal of delivery options
All	Industrial Liaison Tutor replaced with Employer Liaison Tutor
G	Hyperlink included to EFSA eligibility criteria

If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification

Engineering Degree Apprenticeship (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

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	Institution of Engineering and Technology
Final Qualification	BEng Honours
All Final Award titles (Qualification and Subject)	Electrical & Electronic Engineering
FHEQ level of award	6
UCAS code(s)	N/A
Language of Delivery	English

A. Programme Rationale

A degree apprenticeship enables an apprentice to gain a degree alongside gaining valuable work experience. Throughout the apprenticeship apprentices will be in full employment with their academic fees paid by the employer usually using apprenticeship levy funding. Being able to apply their studies in an industrial environment not only enhances the learning experience for the apprentices but helps employers further their employees' careers.

This particular programme will enable apprentices to study the BEng Honours in Electrical and Electronic Engineering at the University of Hertfordshire alongside developing their professional behavioural skills and knowledge to satisfy the requirements for the Embedded Electronic Systems Design and Development Engineer Degree Apprenticeship Standard. This will be achieved through a combination of industrial experience opportunities provided by the employer and academic studies led by UH staff with a wealth of industrial and research experience.

Throughout the apprenticeship, apprentices will be employed by a company who will provide an Individual Learning Plan that includes both time to study as well as work experiences to enable them to apply the skills and knowledge gained through the degree course within the work place.

The Apprenticeship is normally spread over 4 years with apprentices studying three taught modules per semester during Semesters A and B. Two of the modules will be delivered on a one day per week release basis to attend classes at UH. A third module will be delivered to apprentices through two whole weeks (4 days) using blended learning methods (i.e. a combination of face-to-face and on-line learning). These module intensive weeks will typically be delivered a number of weeks apart

to allow apprentices to complete assignments and independent study. There may also be some on-line preparation work to be completed before the first intensive week and a final assignment/assessment after the second intensive week. During Semester C and when the apprentice is not at UH they are expected to be based in industry either completing work set by UH or working for their employer.

In addition to the academic modules studied at UH, apprentices will complete a Professional Practice module each year. This involves recording their work experience and developing a portfolio of evidence as part of their Individual Learning Plan (ILP). The ILP is an essential tool to help the apprentice prepare for the end point assessment by identifying which tasks contribute to meeting each of the Knowledge, Skills and Behavioural requirements listed in the apprenticeship standard. Professional Practice modules are zero credit modules that are used to monitor progress of the portfolio and preparation for the EPA and are not used as a pass/fail element to progress to the next level.

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 high quality education in electrical and electronic engineering;
- provide an education for the individual which enhances his/her prospects of professional employment in engineering and business both in national and international industries;
- provide studies which are accredited by the Institution of Engineering and Technology;
- provide studies which develop an awareness of, and underpinning knowledge and understanding of a broad range of Electrical and Electronic Engineering areas of expertise.

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 defined by the Engineering Council and recommended in the QAA benchmark statements for Engineering (2019) and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2019). The outcomes relate to the typical student. In addition, the SEEC Credit Level Descriptors for Higher Education (2016) have been used to provide guidance for curriculum design at each level of the programme to reflect student development. The curriculum design has also taken into account UH Graduate Attributes.

Knowledge and Understanding	Teaching and learning methods	Assessment strategy
A1-The analytical methods employed by Engineers. A2-The fundamental engineering sciences. A3 - The design principles and design-to-build processes appropriate to electrical and electronic systems. A4-The basic principles and economic, social, legal, ethical and sustainability	Acquisition of knowledge and understanding is through the following approaches: Acquisition of A1 and A2 is through a combination of lectures, small group tutorials, coursework and laboratory work at levels 4 and 5 of the programme. Additional support is provided through the Mathematics Drop-in Centre. Specialist aspects of A2 are further developed at level 6.	Knowledge and understanding are assessed through a combination of unseen examinations (A1, A2, A3 and A5) and in-course assessments (A1-A6) in the form of laboratory reports, essays and phase tests. Some aspects of A3 and A4 are assessed by design exercises and project reports and presentations. At level 6 some

considerations of the business of engineering.
A5-Professional engineering practice.

Acquisition of A3, A4, and A5 is through a combination of lectures, projects and coursework throughout the programme. Staff deploy a range of teaching and learning strategies in the most appropriate way for each individual module. This will vary depending on the subject nature of a particular module and the level of study. A more didactic approach will tend to be adopted at lower levels, in particular for A1 and A2. An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for A3, A4 and A5. 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.

aspects of A5 are assessed by case study reports

Intellectual skills	Teaching and learning methods	Assessment strategy
<p>B1 - Analyse and solve electrical and electronic engineering problems using appropriate techniques.</p> <p>B2 – Model and analyse engineering systems</p> <p>B3-Select appropriate computer based methods for engineering and communication.</p> <p>B4-Evaluate external influences on the design process.</p> <p>B5 - Design electrical and electronic systems, components or processes.</p>	<p>Intellectual skills are developed throughout the programme by the methods and strategies outlined for section A of the intended learning outcomes above, again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for B3, B4 and B5.</p> <p>Analysis, problem solving and modelling skills (B1 and B2) are further developed through tutorial work, laboratory work, in-course exercises and project work.</p> <p>Design and IT skills (B3-B5) are further developed through project work, design exercises and some case study work at level 6.</p> <p>Feedback is given to all students on all coursework produced.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study.</p>	<p>Intellectual skills B1, B2 and B5 are assessed through unseen examination papers, laboratory reports and coursework related to in-course exercises.</p> <p>Intellectual skills B3 and B4 are assessed through project reports and presentations.</p>
Practical skills	Teaching and learning methods	Assessment strategy
<p>C1-Apply analytical and modelling techniques to solve engineering problems.</p> <p>C2 - Perform experimental work in electrical and electronic engineering and draw conclusions</p> <p>C3-Use computer-based engineering tools.</p> <p>C4-Prepare technical documentation.</p> <p>C5 - Evaluate the design of electrical and electronic systems, components or processes.</p> <p>C6-Plan and manage a project, taking into account economic, social, legal, ethical and sustainability constraints.</p>	<p>Practical skills are developed throughout the programme by the methods and strategies outlined in sections A and B of the intended learning outcomes above, again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for C4, C5 and C6.</p> <p>C1 is developed through laboratory work, coursework assignments and tutorial work.</p> <p>C2 is 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</p>	<p>Practical skills are assessed through laboratory reports, coursework assignments, design exercise submissions, case study reports, presentations, project reports and logbooks.</p>

	<p>software documentation, particularly at level 4. C5 is developed through laboratory work at levels 5 and 6. C6 is developed through lectures and project work.</p> <p>Feedback is given to all students on all coursework produced.</p>	
Transferable skills	Teaching and learning methods	Assessment strategy
<p>D1-Communicate effectively, both orally and in writing. D2-Use commonly available IT tools. D3-Manage time and resources effectively. D4-Work effectively within a team as a member. D5-Manipulate, sort and present data. D6-Solve problems in a logical manner. D7-Learn effectively and independently, in all aspects of life.</p>	<p>Transferable skills are developed throughout the programme by the methods and strategies outlined in sections A, B and C of the intended learning outcomes above. D1 is developed through feedback on coursework reports, oral presentations and project reports. D2 is developed through their use in preparing project reports, laboratory reports, case studies, design work, etc. D3 is developed through project work planning and throughout the programme. D4 is developed through group project and assignment work. D5 and D6 are developed through lectures and tutorial work throughout the programme. D7 is developed and promoted throughout the programme.</p> <p>Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.</p>	<p>Transferable skills are assessed through the following approaches:</p> <p>D1, D2, D5 and D6 are assessed through coursework, individual project and technical reports and oral presentations. D4 is assessed by review of group project work.</p> <p>D3 and D7 are specifically assessed by review of an individual's progress during individual project work.</p>

Appendix 1 shows how these programme learning outcomes map to the professional behavioural skills and knowledge requirements listed in the Embedded Electronic Systems Design and Development Engineer Degree Apprenticeship Standard as well as the Engineering Council AHEP learning outcomes and which modules contribute to meeting the Embedded Electronic Systems Design and Development Engineer Degree Apprenticeship Standard requirements.

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

The programme is offered in three optional modes of delivery as described in Section A, and leads to the award of a BEng Degree with Honours in Electrical and Electronic Engineering.

Entry is normally in Semester A at level 4 (with A-Level, or equivalent qualifications) but is possible at level 5 with suitable qualifications (e.g. an Edexcel HND in Engineering with appropriate subjects studied).

Professional and Statutory Regulatory Bodies

The BEng(Hons) Electrical and Electronic Engineering degree is accredited as meeting the academic requirement, in part, for Chartered Engineering registration for the cohorts from 2017 intake up to, and including, 2021 intake by the Institution of Engineering and Technology

Work-Based Learning

As part of a degree apprenticeship apprentices are expected to apply the skills and knowledge they have learnt in the work place. To aid this each apprentice will be allocated an Industrial Mentor by the employer and an Employer Liaison Tutor (ELT) by the School. The Industrial Mentor will be responsible for developing a Schedule of Work in consultation with the Employer Liaison Tutor (ELT) that provides the opportunity to develop the knowledge, skills and behaviours required by the apprenticeship standard. The Industrial Mentor and Employer Liaison Tutor will monitor progress through the Individual Learning Plan. In addition the apprentice shall maintain an e-portfolio of documentary evidence of achievement that is required for the end point assessment. The Industrial Mentor, Apprentice and Employer Liaison Tutor shall meet on a quarterly basis to review progress and make adjustments to the Schedule of Work as appropriate. Records from these meetings shall be included in the e-portfolio.

Apprentices are encouraged to use their experience and their reports as a basis for a presentation to the local Professional Institution Branch, Region or Division possibly through student papers or poster competitions.

End Point Assessment

On completion of the BEng Honours in Electrical and Electronic Engineering apprentices are required to take the end point assessment to complete their apprenticeship. (See the Product Design and Development Engineer Degree Apprenticeship Assessment Plan for details).

Erasmus Exchange programme

N/A

Programme Structure

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

Mode of Study

Part-time

Entry point Semester A

Year 1

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 1)	4ECS2025	0	English	-	-	-	ABC
Engineering Mathematics	4PAM1007	15	English	80	20	-	A
Introduction to Electronic Systems	4ENT1155	15	English	-	100	-	A
Digital Electronics & Computer Organisation*	4ELE0050	15	English	80	20	-	A
Electrical and Electronic Theory	4ENT1026	15	English	80	20	-	B
Electronic Engineering Practice	4ENT1113	15	English	-	100	-	B
Computer Programming for Electronics Engineers*	4ELE0049	15	English	-	100	-	B

* these modules will be delivered using two intensive one-week courses.

- Progression to Year 2 requires a minimum of 60 credits.

Year 2

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 2)	5ECS2000	0	English	-	-	-	ABC
Sustainable Business of Electronics	4ENT1112	15	English	-	100	-	A
Electrical Engineering & Power Control	5ELE0058	15	English	70	30	-	A
Electronic Communication Systems*	5ENT1113	15	English	70	30	-	A
Engineering Applications of Mathematics*	4PAM1033	15	English	-	100	-	B
Real-time Systems & Programming	5ELE0062	15	English	-	100	-	B
Mini Projects (Electrical)	5ENT1075	15	English	-	100	-	B

* these modules will be delivered using two intensive one-week courses.

- Progression to Year 3 requires a minimum of 150 credits.

Year 3

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 3)	6ECS2000	0	English	-	-	100	ABC
Further Engineering Mathematics*	5PAM1005	15	English	70	30	-	A
Digital Design & Embedded Systems	5ELE0060	15	English	70	30	-	A
Digital Signal Processing	6ELE0066	15	English	60	40	-	A
Project Management & Product Development*	5ENT1080	15	English	70	30	-	B
Mechatronic Systems Modelling & Control	5ENT1056	15	English	-	100	-	B
Telecommunication Systems	6ELE0074	15	English	60	40	-	B

* these modules will be delivered using two intensive one-week courses.

- Progression to Year 3 requires a minimum of 240 credits.

Year 4

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 4)	6ECS2001	0	English	-	-	100	ABC
BEng Individual Project (Electrical)*	6ENT1090	30	English	0	100	-	AB
Microelectronics & VLSI	6ENT1027	15	English	60	40	-	A
Power Systems	6ENT1146	15	English	60	40	-	A
Intelligent Systems and Robotics	6ELE0067	15	English	60	40	-	B
Advanced Power Conversion and Control	6ELE0062	15	English	60	40	-	B

* the Individual Project will be employer based.

- The award of an Honours degree requires 360 credit points passed with a minimum of at least 120 at level 6 including the BEng Individual Project (Electrical).

Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in [UPR AS14](#), Section D.

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 Level	Programme Learning Outcomes developed (see above)
BEng (Hons)	Electrical and Electronic Engineering	360 credit points including 240 at level 6/5 of which 120 must be at level 6 Compliance with IET compensation requirements	6	All programme learning outcomes (see Table 2)

Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
University Certificate		45 credit points at level 4	4	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	<i>For untitled awards:</i> See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	<i>For untitled awards:</i> See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
BEng	Electrical and Electronic Engineering	300 credit points including 180 at level 6/5 of which 60 must be at level 6 excluding the BEng Individual Project (Electrical)	6	A1, A2, A3, A4, A5, B1, B2, B3, B5, C1, C2, C3, D5, D6

NB where interim awards are made this will result in non-completion of the apprenticeship.

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

For non-honours awards, the standard University regulations on progression and compensation shall apply, and the Programme Board of Examiners shall have discretion to transfer a student onto a non-honours award where it is to the advantage of the student to do so (for example, where the criteria for progression on an accredited award have not been met).

As specified by the accrediting bodies, a compensated pass cannot be awarded for the Individual Project, which must be included in the calculation of degree classification. Students who do not succeed in the Individual Project may be eligible to repeat, and will be allocated an entirely different project.

To comply with IET accreditation regulations students entering the first year in 2018-2019 must achieve in all 15 credit point modules, after all available attempts under the University regulations, a minimum of 30% (in any allowable attempt) at levels 4, 5 and 6, before the board of examiners will be able to

consider compensation for an accredited honours degree. A maximum of 30 credit points can be compensated across the programme, in line with University regulations. Compensation is not permitted for individual modules worth 30 or more credit points at level 4, 5 and 6.

For non-accredited awards, the standard University regulations on progression and compensation shall apply, and the Programme Board of Examiners shall have discretion to transfer a student onto a non-accredited award where it is to the advantage of the student to do so (for example, where the criteria for progression on an accredited award have not been met).

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
ENDAEE	EE4DA4P-1	BEng (Honours) Electrical and Electronic Engineering	6ENT1090-0906 BEng Individual Project (Electrical)	Yes

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- Dean of School;
- Associate Dean of School (AQA) who has overall responsibility for Quality Assurance and professional body accreditation;
- Associate Dean of School (L&T) who has overall responsibility for Learning & Teaching and Student Experience
- Academic Manager for Degree Apprenticeships
- Employer Liaison Tutor and Industrial Liaison Manager
- the Programme Leader who is responsible for the day to day management of the programme, chairing the programme committee and advising students on the programme;
- an Admissions Tutor, with specific responsibility for selection;
- a programme committee that includes the above plus student representation;
- module leaders who are responsible for individual modules.

Support

Students are supported by:

- An induction week at the beginning of each new academic session;
- An extensive Learning Resources Centre, incorporating a library and computer centre;
- Guided student-centred learning through the use of StudyNet;
- A student handbook that is specific to the programme;
- A Programme Leader who can advise on programme issues;
- A Employer Liaison Tutor who will also act as a Personal Tutor
- An Industrial Mentor
- Module teaching teams who provide academic support;
- Computer and technical laboratories facilities and technical support staff;
- A project supervisor;
- Student representatives on the programme committee;
- The Mathematics Drop-in Centre;
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters;
- The Medical Centre;

- Printing, photocopying, laminating and document binding facilities;
- Nightline – a confidential student listening and information service in the evening when other services are not available;
- A confidential counselling service;
- University Disability Advisors;
- The Students' Union.

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 Engineering Apprenticeship Handbook;
- A Definitive Module Document (DMD) for each constituent module;
- A Module Guide 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/>. Furthermore, the OfS has judged that the University of Hertfordshire delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK. Consequently, the University received a Gold award in the 2018 Teaching Excellence and Student Outcomes (TEF) exercise. This award was made in June 2018 and is valid for up to 3 years. The TEF panel's report and conclusions can be accessed at: <https://www.officeforstudents.org.uk/advice-and-guidance/teaching/tef-outcomes/#/provider/10007147>

G. Entry requirements

Applicants must be working in the engineering sector in a role which provides sufficient work-based learning scope to acquire the knowledge, skills and behaviour expected by the Apprenticeship Standard. They must be supported by their employer to engage in the expected off the job learning, through to End-Point Assessment and satisfy the [EFSA eligibility criteria](#) - "Who can be funded" (starts on page 18 at P77).

The normal entry requirements for the programme are:

Normal entry requirements at level 4 are:

- GCSE Maths at grade 4, English Language at grade 4 and Science at grade 4 or above or the equivalent;
- 104 UCAS points

- BCC or equivalent. Minimum of 2 A levels.
- A levels to include Maths and either Physics or Technology or engineering based subjects excluding General Studies and Critical Thinking.

Applications are also welcomed from those holding other equivalent qualifications including, but not limited to:

- Engineering BTEC Extended Diploma with a Distinction in the Further Maths unit or equivalent, with Distinction, Merit, Merit overall.
- Engineering Advanced Diploma to include A level Maths as ASL component.
- Access to Engineering Diploma with 45 Level 3 credits at Merit to include Maths and Science or Principles units. Any additional L3 credits must be at Merit.
- Those holding equivalent qualifications will be required to discuss their individual circumstances with the appropriate Admissions Tutor.

Applicants who do not meet these normal entry requirements may be eligible for entry to an appropriate HND or Foundation Degree elsewhere, and then subsequent admission to this programme at level 5 (see below).

Direct Entry at year 2

It is possible for apprentices to enter the programme at year 2 if they have prior certified learning. In all instances, applicants will be required to discuss their individual circumstances with the appropriate Admissions Tutor. ESFA funding rules do not allow any repeated learning and all applicants will undergo an initial needs assessment to ensure that the planned programme only includes new learning.

Apprentices applying for direct entry into level 5 are required to have an HND or Foundation Degree, or equivalent, in an appropriate discipline with merits and distinctions in appropriate subjects which must include Mathematics plus technical or physical sciences.

English Language Requirements

In addition to the requirements stated above, students entering the programme and whose first language is not English will be required to demonstrate a proficiency in English to TOEFL 550/IELTS 6.0 or an equivalent recognised qualification

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).

If you would like this information in an alternative format please contact:
Academic Manager for Engineering Degree Apprenticeships
(d.a.germany@herts.ac.uk)

If you wish to receive a copy of the latest Programme Annual Monitoring and Evaluation Report (AMER) and/or the External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

BEng (Honours) Electrical and Electronic Engineering

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

The following maps identify where the programme learning outcomes are assessed in the constituent modules. They provide;

- 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.

The key to the learning outcomes are as listed in Section 1.C. The modules include;

	Module Title	Module Code	Knowledge & Understanding					Intellectual Skills					Practical Skills						Transferable Skills						
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6	D7
Level 4	Professional Practice (Year 1)	4ECS2025																							
	Engineering Mathematics	4PAM1007																							
	Introduction to Electronic Systems	4ENT1155																							
	Sustainable Business of Electronics	4ENT1112																							
	Digital Electronics & Comp Org	4ELE0050																							
	Engineering Applications of Maths	4PAM1033																							
	Electrical and Electronic Theory	4ENT1026																							
	Electronic Engineering Practice	4ENT1113																							
Level 5	Computer Prog for Elec Engineers	4ELE0049																							
	Professional Practice (Year 2)	5ECS2000																							
	Further Engineering Mathematics	5PAM1005																							
	Digital Design & Embedded Systems	5ELE0060																							
	Electrical Engineering & Power Control	5ELE0058																							
	Electronic Communication Systems	5ENT1113																							
	Project Management & Product Dev	5ENT1080																							
	Real-time Systems & Programming	5ELE0062																							
Level 6	Mechatronic Sys Modelling & Control	5ENT1056																							
	Mini Projects (Electrical)	5ENT1075																							
	Professional Practice (Year 3)	6ECS2000																							
	Professional Practice (Year 4)	6ECS2001																							
	BEng Individual Project (Electrical)	6ENT1090																							
	Microelectronics & VLSI	6ENT1027																							
	Digital Signal Processing	6ELE0066																							
	Power Systems	6ENT1146																							
Level 6	Intelligent Systems and Robotics	6ELE0067																							
	Advanced Power Conversion & Control	6ELE0062																							
	Telecommunication Systems	6ELE0074																							

Appendix 1 - Learning Outcomes Mapping of Degree Apprenticeship Standards to the BEng in Electrical and Electronics Engineering

Degree Apprenticeship Standard Requirements	AHEP3 IEng LOs (Appendix 3)	AHEP3 CEng(partial) LOs (Appendix 4)	UH Programme LOs	Modules that contribute to the assessment of the requirement
Knowledge:				
Electrical circuit theory	SM1i, EA2i	SM1p, EA2p	A1, B1, B2	4ENT1155 Introduction to Electronic Systems 4ENT1026 Electrical and Electronic Theory
Electronic components	SM1i, EA2i	SM1p, EA2p	A2, B5, C5	4ENT1155 Introduction to Electronic Systems 4ENT1026 Electrical and Electronic Theory 4ELE0050 Digital Electronics & Computer Organisation 6ELE0068 Microelectronics & VLSI
Analogue and digital design techniques	EA2i, D2i, D3i, D4i, D5i, D6i, EP3i, EP4i	EA2p, D2p, D3p, D4p, D5p, D6p, EP3p, EP4p	A3, B5, C5	4ELE0050 Digital Electronics & Computer Organisation 5ELE0060 Digital Design & Embedded Systems 6ELE0068 Microelectronics & VLSI
Structured software	EA2i, EA3i, EA4i, EP2i, EP5i	EA2p, EA3p, EA4p, EP2p, EP5p	A3, B3, C3	4ELE0049 Computer Programming for Electronics Engineers 5ELE0062 Real-time Systems & Programming
Company Specifics	DT1i, ET1i, ET2i, ET3i, ET4i, ET5i, ET6i, EP5i, EP6i, EP7i	DT1p, ET1p, ET2p, ET3p, ET4p, ET5p, ET6p, EP5p, EP6p, EP7p	A4, A5, B4, C6	4ENT1112 Sustainable Business of Electronics
Skills:				
Circuit design	EA1i, EA2i, EA3i, EA4i, D2i, D3i, D4i, D5i, D6i	EA1p, EA2p, EA3p, EA4p, D2p, D3p, D4p, D5p, D6p	A3, B1, B5, C5	4ENT1155 Introduction to Electronic Systems 4ENT1026 Electrical and Electronic Theory 4ENT1113 Electronic Engineering Practice 4ELE0050 Digital Electronics & Computer Organisation 5ELE0060 Digital Design & Embedded Systems 5ENT1113 Electronic Communication Systems
Circuit layout	D2i, D3i, D4i, D5i, EP3i, EP5i	D2p, D3p, D4p, D5p, EP3p, EP5p	B3, C4	4ENT1155 Introduction to Electronic Systems 4ENT1026 Electrical and Electronic Theory 4ENT1113 Electronic Engineering Practice 4ELE0050 Digital Electronics & Computer Organisation 5ELE0060 Digital Design & Embedded Systems
Structured programming for embedded software	EA1i, EA2i, EA3i, EA4i,	EA1p, EA2p, EA3p, EA4p, D2p, D4p,	B3, B5, C3, C5	4ELE0049 Computer Programming for Electronics Engineers 5ELE0060 Digital Design & Embedded Systems 5ELE0062 Real-time Systems & Programming

	D2i, D4i, EP2i, EP5i, EP6i	EP2p, EP5p, EP6p		6ELE0066 Digital Signal Processing 6ELE0067 Intelligent Systems and Robotics
Mathematical modelling	SM2i, EA1i, EA2i	SM2p, EA1p, EA2p	B1, B2, C1	4PAM1007 Engineering Mathematics 4PAM1033 Engineering Applications of Mathematics 5PAM1005 Further Engineering Mathematics 5ENT1056 Mechatronic Systems Modelling & Control
Design for purpose	EA3i, EA4i, D1i, D2i, D3i, D4i, D5i, ET4i, ET5i, ET6i, EP5i, EP6i	EA3p, EA4p, D1p, D2p, D3p, D4p, D5p, ET4p, ET5p, ET6p, EP5p, EP6p	A3, B4, B5, C5, D6	5ELE0060 Digital Design & Embedded Systems 5ENT1113 Electronic Communication Systems 5ENT1080 Project Management & Product Development 5ELE0058 Electrical Engineering & Power Control 5ENT1056 Mechatronic Systems Modelling & Control 6ELE0066 Digital Signal Processing 6ENT1146 Power Systems 6ELE0062 Advanced Power Conversion and Control 6ELE0074 Telecommunication Systems 6ENT1090 BEng Individual Project (Electrical)
Testing methodology	EA2i, ET6i, EP3i, EP4i, EP6i,	EA2p, ET6p, EP3p, EP4p, EP6p	C2, C3, C5,	4ENT1113 Electronic Engineering Practice 5ENT1075 Mini Projects (Electrical) 6ENT1146 Power Systems 6ENT1090 BEng Individual Project (Electrical)
Product transition into production	D1i, D2i, D3i, D4i, ET1i, ET2i, ET4i, ET5i, ET6i, EP2i, EP3i, EP5i, EP6i	D1p, D2p, D3p, D4p, ET1p, ET2p, ET4p, ET5p, ET6p, EP2p, EP3p, EP5p, EP6p	A3, B4, C6	5ENT1080 Project Management & Product Development 6ELE0067 Intelligent Systems and Robotics
Project Management	D1i, D2i, D5i, D6i, ET1i, ET2i, ET3i, ET5i, ET6i, EP1i, EP5i, EP6i, EP7i	D1p, D2p, D5p, D6p, ET1p, ET2p, ET3p, ET5p, ET6p, EP1p, EP5p, EP6p, EP7p	A4, B4, C4, C6, D1, D2, D3, D4	5ENT1080 Project Management & Product Development 6ENT1090 BEng Individual Project (Electrical)
Compliance	D1i, D2i, ET1i, ET5i, ET6i, EP3i, EP5i	D1p, D2p, ET1p, ET5p, ET6p, EP3p, EP5p	A4, A5, B1, C4, C6, D3	4ENT1112 Sustainable Business of Electronics 5ENT1080 Project Management & Product Development
Commercial awareness	D1i, D2i, D5i, ET1i, ET2i,	D1p, D2p, D5p, ET1p, ET2p,	A4, A5, B4, C6	4ENT1112 Sustainable Business of Electronics 5ENT1080 Project Management & Product Development

	ET5i, ET6i, EP5i	ET5p, ET6p, EP5p		5ENT1075 Mini Projects (Electrical)
Health and Safety	D2i, ET5i, ET6i, EP3i, EP5i	D2p, ET5p, ET6p, EP3p, EP5p	A4, A5, B4, C2, C6	4ENT1113 Electronic Engineering Practice 5ENT1080 Project Management & Product Development 6ENT1090 BEng Individual Project (Electrical)
Behaviours:				
Motivation	AGS2, AGS3, AGS4	AGS2, AGS3, AGS4	D7 + See Graduate Attributes (See Appendix 5)	5ENT1075 Mini Projects (Electrical) 6ENT1090 BEng Individual Project (Electrical) Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)
Communication	D6i, EP7i, AGS1, AGS4	D6p, EP7p, AGS1, AGS4	D1 + See Graduate Attributes (See Appendix 5)	4ENT1112 Sustainable Business of Electronics 6ENT1090 BEng Individual Project (Electrical) Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)
Team ethos and leadership	EP7i, AGS1, AGS4	EP7p, AGS1, AGS4	D4 + See Graduate Attributes (See Appendix 5)	5ENT1080 Project Management & Product Development Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)
Continuous development	AGS2, AGS3	AGS2, AGS3	D7 + See Graduate Attributes (See Appendix 5)	Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)
Problem solving/practicality.	EA3i, EA4i, D4i, AGS1	EA3p, EA4p, D4p, AGS1	B1, D6 + See Graduate Attributes (See Appendix 5)	5ELE0058 Electrical Engineering & Power Control 5ENT1056 Mechatronic Systems Modelling & Control 5ENT1075 Mini Projects (Electrical) 6ELE0066 Digital Signal Processing 6ENT1146 Power Systems 6ELE0062 Advanced Power Conversion and Control 6ELE0074 Telecommunication Systems 6ENT1090 BEng Individual Project (Electrical) Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)
Responsibility	D2i, ET1i, ET4i, ET5i, EP3i	D2p, ET1p, ET4p, ET5p, EP3p	D7 + See Graduate Attributes	4ENT1112 Sustainable Business of Electronics 5ENT1080 Project Management & Product Development Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)

			(See Appendix 5)	
Ethics and professional standards	D2i, ET1i, ET2i, ET5i, ET6i, EP3i, EP5i, EP6i, EP7i, AGS4	D2p, ET1p, ET2p, ET5p, ET6p, EP3p, EP5p, EP6p, EP7p, AGS4	A4, A5, C6, D4 + See Graduate Attributes (See Appendix 5)	4ENT1112 Sustainable Business of Electronics 6ENT1090 BEng Individual Project (Electrical) Professional Practice (Year 1), (Year 2), (Year 3), (Year 4)

Appendix 3 - Engineering Council – UK-SPEC Learning Outcome Codes for IEng accreditation

AHEP code	Learning Outcome
Science and Mathematics	
SM1i	Knowledge and understanding of the scientific principles underpinning relevant current technologies, and their evolution
SM2i	Knowledge and understanding of mathematics and an awareness of statistical methods necessary to support application of key engineering principles
Engineering Analysis	
EA1i	Ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement.
EA2i	Ability to apply quantitative methods in order to understand the performance of systems and components.
EA3i	Ability to use the results of engineering analysis to solve engineering problems and to recommend appropriate action.
EA4i	Ability to apply an integrated or systems approach to engineering problems through know-how of the relevant technologies and their application.
Design	
D1i	Be aware of business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.
D2i	Define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards
D3i	Work with information that may be incomplete or uncertain and be aware that this may affect the design
D4i	Apply problem-solving skills, technical knowledge and understanding to create or adapt design solutions that are fit for purpose including operation, maintenance, reliability etc
D5i	Manage the design process, including cost drivers, and evaluate outcomes
D6i	Communicate their work to technical and non-technical audiences.
Economic, legal, social, ethical and environmental context	
ET1i	Understanding of the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct
ET2i	Knowledge and understanding of the commercial, economic and social context of engineering processes
ET3i	Knowledge of management techniques that may be used to achieve engineering objectives
ET4i	Understanding of the requirement for engineering activities to promote sustainable development
ET5i	Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues
ET6i	Awareness of risk issues, including health & safety, environmental and commercial risk.
Engineering Practice	
EP1i	Knowledge of contexts in which engineering knowledge can be applied (eg operations and management, application and development of technology, etc)
EP2i	Understanding of and ability to use relevant materials, equipment, tools, processes, or products
EP3i	Knowledge and understanding of workshop and laboratory practice
EP4i	Ability to use and apply information from technical literature
EP5i	Ability to use appropriate codes of practice and industry standards
EP6i	Awareness of quality issues and their application to continuous improvement
EP7i	Awareness of team roles and the ability to work as a member of an engineering team.
Additional General Skills	
AGS1	Apply their skills in problem solving, communication, working with others, information retrieval and the effective use of general IT facilities
AGS2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
AGS3	Monitor and adjust a personal programme of work on an on-going basis
AGS4	Exercise initiative and personal responsibility, which may be as a team member or leader

Appendix 4 - Engineering Council – UK-SPEC Learning Outcome Codes for CEng (partial) accreditation

AHEP code	Learning Outcome
Science and Mathematics	
SM1p	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies.
SM2p	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems.
SM3p	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline.
Engineering Analysis	
EA1p	Understanding of engineering principles and the ability to apply them to analyse key engineering processes.
EA2p	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
EA3p	Ability to apply quantitative and computational methods in order to solve engineering problems and to implement appropriate action.
EA4p	Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems.
Design	
D1p	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.
D2p	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards.
D3p	Work with information that may be incomplete or uncertain and quantify the effect of this on the design.
D4p	Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal.
D5p	Plan and manage the design process, including cost drivers, and evaluate outcomes.
D6p	Communicate their work to technical and non-technical audiences.
Economic, legal, social, ethical and environmental context	
ET1p	Understanding of the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct
ET2p	Knowledge and understanding of the commercial, economic and social context of engineering processes
ET3p	Knowledge and understanding of management techniques, including project management, that may be used to achieve engineering objectives
ET4p	Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate
ET5p	Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues
ET6p	Knowledge and understanding of risk issues, including health & safety, environmental and commercial risk, and of risk assessment and risk management techniques
Engineering Practice	
EP1p	Understanding of contexts in which engineering knowledge can be applied (eg operations and management, application and development of technology, etc)
EP2p	Knowledge of characteristics of particular materials, equipment, processes, or products
EP3p	Ability to apply relevant practical and laboratory skills
EP4p	Understanding of the use of technical literature and other information sources
EP5p	Knowledge of relevant legal and contractual issues
EP6p	Understanding of appropriate codes of practice and industry standards
EP7p	Awareness of quality issues and their application to continuous improvement
EP8p	Ability to work with technical uncertainty
EP9p	Understanding of, and the ability to work in, different roles within an engineering team.
Additional General Skills	
AGS1	Apply their skills in problem solving, communication, working with others, information retrieval and the effective use of general IT facilities
AGS2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
AGS3	Monitor and adjust a personal programme of work on an on-going basis
AGS4	Exercise initiative and personal responsibility, which may be as a team member or leader

Appendix 5 - UH Graduate Attributes

This programme embodies the University of Hertfordshire graduate attributes extensively – indeed these attributes align very well with the requirements of UK-SPEC which these programmes fulfil in order to be accredited. The following paragraphs indicate how this is achieved.

Professionalism, employability and enterprise

Being a vocational programme apprentices will have many opportunities to develop communication skills, work independently and in teams both in industry and at UH, building confidence at problem solving and developing creativity and self-management skills in the context of the Electronics industry. Team work is fostered through group work in various modules in each year as well as working alongside practicing engineers in industry. Apprentices have contact with practicing engineers not just through their own companies but also through guest lecturers on various academic modules. Apprentices are encouraged to seek recognition of their industrial experience by gaining EngTech or ICTTech, registration with the IET.

Learning and research skills

The apprenticeship programme provides opportunities to develop effective learning skills. As part of the induction process apprentices will be introduced to the learning and research resources available within the University and on line through UH's Virtual Learning Environment, Studynet. In subsequent years, these skills are enhanced and supported by Helen Singer, the Schools' Information Manager. These skills are assessed through a number of modules and particularly in 6ENT1090 BEng Individual Project (Electrical).

Intellectual depth, breadth and adaptability

The University encourages engagement in curricular, co-curricular and extra-curricular activities that deepen and broaden knowledge and develop powers of analysis, application, synthesis, evaluation and criticality. This occurs throughout the curriculum as the students/apprentices are exposed to Engineering Mathematics and Science, including technically deepening specialist topics appropriate to their discipline, providing a theoretical underpinning and practical work in laboratories which are then brought together in the Mini Projects at level 5 and the BEng Individual Project (Electrical) at level 6. Apprentices will be encouraged to adapt the technical skills they have learnt at UH in the work place. Apprentices will be expected to record these experiences as part of their Logbook which will be assessed during the end point assessment.

Respect for others

The School of Physics, Engineering and Computer Science attract students from diverse backgrounds both geographically and culturally and strive to promote self-awareness, empathy, cultural awareness and mutual respect, all key ingredients for successful team working. Apprentices will be studying, and at times working, alongside these students in group activities such as laboratory experiments. In addition they will gain further experience of working in multidisciplinary teams within their companies. Apprentices will be expected to record these experiences as part of their Logbook which will be assessed during the end point assessment.

Social responsibility

The School, primarily through the use of project work, steers their graduates towards an understanding that the actions they take really can make a positive contribution to society. As Engineers and Technologists, students and apprentices are taught the importance of environmental, economical, ethical, regulatory and consumer requirements when designing new products. This is formally covered in Project Management & Product Development but expected to be applied during several modules and particularly of the BEng Individual Project (Electrical).

Global Awareness

Many employers of apprentices are international organisations and even those that are not will be importing materials/services and/or exporting products or services. As such apprentices will naturally gain a global awareness through the industrial experience with their employer.

Section 2

Programme management

Relevant QAA subject benchmarking statements	Engineering
Type of programme	Undergraduate – Apprenticeship Degree
Date of validation/last periodic review	March 18
Date of production/ last revision of PS	August 2020
Relevant to level/cohort	Level 4 entering September 2020
Administrative School	School of Physics, Engineering and Computer Science

Table 3 Course structure

Course details		
Course code	Course description	HECOS
ENDAEE	BEng (Hons) Electrical and Electronic Engineering (Degree Apprenticeship)	100163