

ASTON UNIVERSITY PROGRAMME SPECIFICATION

Programme Title	Electronic Engineering and Computer Science (with placement)
UCAS/JACS Code	GH64
School/Subject Area	Engineering and Applied Science - Electronic Engineering
Final Award	MEng Honours Degree ("MEng with professional placement" for fast track sandwich students)
Interim Awards	Certificate of Higher Education , Diploma of Higher Education, BEng (Hons), (subject to completion of required modules)
Mode(s) of Study	Sandwich
Normal Length of Programme	4 years
Total Credits	MEng Degree: 540 credits (90 at level P)
Programme Accredited By	The Institution of Engineering and Technology (IET)
Dates Programme Specification Written and Revised	December 2010; last revised September 2014

<p>Education Aims of the Programme</p>	<p>Digital electronics and computer systems are pervasive in commerce, industry and the home and have an ever increasing impact on the way we work and live. To gain the competitive edge over its global rivals British industry and commerce needs trained electronic and computer systems engineers with both hardware and software skills who can harness and influence the growth of this technology.</p> <p>This fast-track, higher level qualification allows students to gain an MEng qualification in four years and include a 1 year industrial placement. There is a strong emphasis on project work in all years allowing you to develop your engineering and management skills by working on engaging projects.</p> <p>The Electronic Engineering and Computer Science courses at Aston aim to meet the requirements of todays workplace by expanding the breadth and depth of our students knowledge in electronics, internet technology, computing, digital systems and software design. It also enables the development of essential professional skills. This degree places emphasis on gaining a specialist and extremely valuable set of skills that form a bridge between the hardware and software; to achieve this students will study computing and electronics with single honours students from the electronic engineering and computer science subject groups.</p> <p>The MEng and BEng programmes share a common first two years. Students start by learning the basic principles of analogue, digital and programmable electronic systems and software design. They will also take courses in mathematics and entrepreneurship. The second year covers digital and programmable systems, communication systems and computer systems in more depth. An extended design project will enable the students to develop their professional electronic design and management skills. Transfer between the BEng and MEng programmes is possible at this point subject to meeting the relevant entry requirements. MEng students then take additional modules at the end of the second year.</p> <p>The final two years allows students to develop skills in engineering, computing and management to a greater depth and gain valuable experience working on an engineering placement. By taking supplementary distance learning modules in the third year whilst on a placement (either industrial or international study) they can incorporate the placement within the four years saving both time and money. In the final year students take a range of Masters level courses in area such as communications, sensing and software design. They also complete an extended individual project in an area of interest.</p> <ul style="list-style-type: none"> • Accredited by the Institution of Engineering and Technology (IET) and the British Computer Society (BCS) • University funded student membership of the IET • Student run open-access electronics lab • Provides a thorough grounding in the basic principles of modern electronic engineering and computer science • Relevant industrial or commercial experience in placement year.
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Relevant Subject Benchmark Statements and other External and Internal Reference Points used to inform programme outcomes	QAA General Engineering benchmarks IET accreditation requirements Engineering Professors Council report on output standards Engineering Council UK-SPEC requirements for CEng UK Quality Code Part A.1 (2011) Bologna Accord
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Programme Structures and Requirements: Levels, Modules and Credits						
Stage 1						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Java Programming Foundations (CS)	20	4	CS1310	Core		
Java Program Development	20	4	CS1410	Core		
Digital and Analogue Electronics	20	4	EE1DAE	Core	Y	Y
Electrical Circuit Theory	10	4	EE1ECT	Core		
Engineering Projects and Entrepreneurship 1	10	4	EE1EPE	Core		
Electrical Systems Engineering	20	4	EE1ESE	Core	Y	Y
Transition Mathematics for Engineers	10	4	SE11EM	Core		
Mathematics for First Year Engineers	10	4	SE12EM	Core		
TOTAL	120					

Programme Structures and Requirements: Levels, Modules and Credits						
Stage 2						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Software Engineering	20	5	CS2020	Core		
Operating Systems	10	5	CS2230	Core		
Human-Computer Interaction	10	5	CS2260	Core		
Data Structures and Algorithms with Java	10	5	CS2310	Core		
Analogue Electronics	10	5	EE2AEL	Core		
Communication Systems	10	5	EE2CSY	Core		
Digital Programmable Systems	10	5	EE2DPS	Core		
Electronics Group Design Project	20	5	EE2EDP	Core		
The Professional Engineer	10	5	EE2PST	Core		
Sequential State Machines	10	5	EE2SSM	Core		
TOTAL	120					

Programme Structures and Requirements: Levels, Modules and Credits Stage 3 (inc. Placement)						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Sustainability for Engineers	15	7	BHM345	Core		
C Programming for EECS Students	10	6	EE3CCS	Core		
Digital transmission and communication systems	20	6	EE3DDT	Core		
Leadership in Engineering	15	7	SE4051	Core		
Choose 120 credits from the following options						
International Placement Assessment	30	6	EE3IPA	Option		
MEng International Study Year	90	P	EE3MIP	Option		
MEng Industrial Placement Year	90	P	EE3MPY	Option		
Individual Research	30	6	EE3RSC	Option		
TOTAL	180					

Programme Structures and Requirements: Levels, Modules and Credits**Stage 4**

Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Sustainability in Science, Technology	15	7	BHM367	Core	N	Y
Digital Systems Design	20	6	EE3DSD	Core		
MEng Final Year Project	40	7	EE4PRJ	Core	Y	N
Choose 45 credits from the following options						
Distributed Systems	10	6	CS3250	Option		
Data Mining	10	6	CS3440	Option		
Information Security	15	7	CS4520	Option		
Interaction design	15	7	CS4650	Option		
Software Process and Management	20	7	CS4670	Option		
Enterprise Computing Strategies	15	7	CS4810	Option		
Reliability in Software Engineering	15	7	CS4820	Option		
Requirements engineering	10	7	CS4830	Option		
Software architecture	15	7	CS4840	Option		
Digital Systems Architecture	10	6	EE3DSA	Option		
Network Product Development	10	6	EE3NPD	Option		
Telecommunications Perspectives	10	7	EE4000	Option		
Mobile Data Networks	10	7	EE4016	Option		
Radio Systems and Personal Communications Networks	10	7	EE402B	Option		
Internetworking	10	7	EE403B	Option		
Digital Systems Architectures	10	7	EE4DSA	Option		
Optical Sensing Systems	10	7	EE4OSS	Option		
Wireless Sensor Networks	10	7	EE7003	Option		
TOTAL	120					

Programme Outcomes, Learning and Teaching and Assessment Strategies

Knowledge and Understanding

On successful completion of their programme students, are expected to have knowledge and understanding of:		Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated	
		Learning and Teaching Methods	Assessment Methods
1	Basic Mathematics, Science and Technology underpinning electrical and electronic engineering and computer science	A mixture of formal lectures, example classes, practical laboratory work, small group tutorials, self-study and group and individual project work. Distance learning will be used when the students are on placement.	Unseen written examinations, written coursework (in the form of experimental reports, essays, solved problems and dissertation), supervisor assessed project work, oral examinations, presentations, and computer based testing.
2	Fundamental concepts and principles of electrical and electronic engineering and computer science		
3	Analysis, design and implementation techniques applicable to electrical and electronic engineering and computer science, including the appropriate use of test and measurement equipment for circuit characterisation		
4	Business and management techniques relevant to electrical and electronic engineering and computer science		
5	The role of the Engineer in society including professional and ethical responsibilities and constraints affecting engineering judgement		
6	Specialist knowledge of electrical and electronic engineering and computer science		
7	The strategic importance of business processes		
8	Business and Management techniques		
9	The relevance of the programme's discipline-specific and generic content to the world of work		

Intellectual Skills			
On successful completion of their programme students, are expected to have knowledge and understanding of:		Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated	
		Learning and Teaching Methods	Assessment Methods
1	Analyse and solve electrical and electronic engineering and computer science problems	<p>Analysis and problem solving skills are developed through formal lectures, example classes, small group tutorials, and self-study.</p> <p>Experimental and design skills are primarily obtained via practical classes and individual and group projects.</p> <p>Distance learning will be used when the students are on placement.</p>	<p>Unseen written examinations, written coursework (in the form of experimental reports, essays, solved problems and dissertation), supervisor assessed project work, oral examinations, presentations.</p>
2	Evaluate, integrate and apply knowledge and methods from a variety of sources		
3	Plan, conduct, evaluate and report on a programme of work involving systems from the domain of electrical and electronic engineering and computer science		
4	Design a solution to an engineering problem from the domain subject to various constraints; evaluate that design and make improvements		
5	Work independently by taking responsibility for the management of their own study and learning.		
6	Critically appraise different methods and techniques of problem-solving, assessing their effectiveness and applicability.		
7	Handle an open-ended project which stretches and develops the students; problem-solving and creative thinking capacities.		
8	Investigate, analyse and report on a specialised topic with a view towards innovation and gaining a fresh insight		

Professional Skills			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated	
		Learning and Teaching Methods	
		Assessment Methods	
1	Specify, design and implement systems from the domain of electrical and electronic engineering and computer science using appropriate equipment and support environments	<p>A mixture of formal lectures, console classes, self-study and group and individual project work.</p> <p>Distance learning will be used when the students are on placement</p>	<p>Unseen written examinations, written coursework (in the form of experimental reports, solved problems and dissertation), presentations.</p> <p>The placement will be assessed by means of an e-portfolio and presentation.</p>
2	Plan and carry out testing and measurement of systems from the domain of electrical and electronic engineering and computer science using appropriate equipment and support environments		
3	Prepare a technical report or presentation		
4	Design and implement computer programs to modest level of complexity using appropriate methods		
5	Use computer packages appropriate to the domain of electrical and electronic engineering and computer science		
6	Demonstrate completion of Training consistent with UK SPEC		
7	Apply principles, models and theories in the working environment.		
8	The ability to carry out product/technology development in industrial or academic environment and to understand innovation processes and IPR issues.		
9	Self-study and independent learning skills to facilitate professional development		

Transferable Skills			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated	
		Learning and Teaching Methods	
		Assessment Methods	
1	The ability to communicate and work effectively as an individual or a member of a team within an organisation	A mixture of formal lectures, example classes, console classes, practical laboratory work, small group tutorials, self-study and group and individual project work.	Unseen written examinations, written coursework (in the form of experimental reports, essays, solved problems and dissertation), supervisor assessed project work, oral examinations, presentations, computer based testing. Many of these skills are assessed indirectly via other learning outcomes.
2	The ability to communicate effectively both in writing and orally using appropriate tools		
3	The ability to model engineering systems appropriate to the domain of electrical and electronic engineering.		
4	The ability to use appropriate ICT in a wide variety of situations		
5	The ability to manage time and resources		
6	Self-study and independent learning skills to facilitate professional development		
7	Business and management knowledge applicable to industry and team leader role		
8	Creativity and problem solving skills		
9	Project and time management skills		
10	The ability to learn independently		
11	Team working and team leading skills in basic and advanced projects.		

Entry Requirements	<ol style="list-style-type: none"> 1. In addition to satisfying the general entry requirements (as stated in the General Regulations for Undergraduate Programmes), the applicant must have passed three GCE Advanced level subjects including Mathematics and a Physical Science at grades prescribed by School Learning and Teaching Committee. Other subjects and other qualifications of equivalent standing, as approved by School Learning and Teaching Committee, may be acceptable alternatives. 2. Applications from mature students with appropriate experience will be considered on merit. 3. Students already reading another degree programme at Aston University may be allowed to transfer to this programme, with the agreement of the Schools Associate Dean for Undergraduate Programmes and the Programme Director.
Programme Regulations	<p>1 MODULE REQUIREMENTS</p> <p>1.1 This programme offers an MEng degree, transfer to BEng (Hons) is possible at stages 1-3.</p> <p>1.2 Electives should be chosen following discussion with the Programme Director.</p> <p>2 ATTENDANCE</p> <p>2.1 Students are normally required to attend the University for three stages and undertake an approved placement for one stage after the second year subject to meeting performance criteria.</p> <p>2.2 In order to qualify for the award of the degree a student must have attended the required proportion of tutorials, seminars, practical classes and lectures. In the case of repeated unexcused absence over a period of two weeks or more, disciplinary proceedings may be instituted in the form of an official warning letter requiring attendance. If there is no response to this letter or satisfactory attendance is not resumed, the Schools Executive Dean may require the student to withdraw from the programme.</p> <p>3 INDUSTRIAL/PROFESSIONAL EXPERIENCE AND ASSESSMENT</p> <p>3.1 Students are required to undertake an appropriate programme of integrated industrial training normally of at least 40 weeks duration during the programme at such times as approved by the Schools Executive Dean.</p> <p>3.2 In accordance with University Regulations, the student is required to produce a reflective account of the placement experience, such as a e-portfolio; to submit satisfactory reports; and to give a presentation of the work carried out during the placement stage. Independent feedback from employer and tutors will also be used in the assessment.</p> <p>3.3 This work will be assessed as one module, worth 90 credits at level P. The placement is graded and does contribute to the classification of the degree awarded.</p> <p>3.4 30 credits of academic work will be undertaken at the end of the second year before the start of the placement. An additional 30 credits of academic work in the form of a literature review and case study will be undertaken at the same time as the placement alongside 30 credits of engineering management modules.</p> <p>3.5 Students may opt to study approved modules at an approved partner institution instead of the placement. This will be assessed as two modules. One module, worth 90 credits at level P, will be graded by taking the overall average grade from the best 90 credits taken by the student during the year (or equivalent). Some adjustment to the final mark may be made depending on the marking scheme in place at the host institution. A further 30 credits at level 6 will be awarded on the basis of an academic report on the placement. An additional 30 credits of engineering management modules.</p> <p>3.6 Stage 3 runs from post summer exams in Stage 2 until October the following year.</p>

4 PROGRESSION REQUIREMENT

4.1 An essential requirement in the formation of an engineer is the ability to perform practical work and to convey the results to others, for example by means of written reports. In consequence, students who have not submitted a significant proportion of the laboratory reports or other forms of continuous assessment contributing to stages one to three of the programme may not proceed until they have done so, at the discretion of the Board of Examiners. The significant proportion shall be normally at least 50% of the reports required for each assessment or exceptionally some other level decided by the Board of Examiners. This condition shall apply even when a student has otherwise satisfied the module requirements for progression.

4.2 In order to satisfy the IETs academic requirements towards Chartered Engineer status the following condition must be met: a pass in the module EE4PRJ (at first attempt) and at least an overall second class degree.

4.3 In order to progress to the 3rd Year of the MEng students must normally achieve an overall aggregate mark of at least 60% in the first two years. Students who fail to achieve this will normally be required to transfer to the 3rd Year of the BEng unless they have the support of the Programme Director to do otherwise.

4.4 **Exemption from Aston University General Regulations** Due to accreditation requirements by the Institute of Engineering Technology (IET), no more than 20 credits per 120 credits will be condoned at each stage of this programme.

5. CALCULATION OF FINAL AWARD

5.1 Industrial Placement/ Academic overseas placement students - Year 2: 10%, Year 3P: 30%, Year 4: 60%

General Regulations (<http://www1.aston.ac.uk/registry/for-staff/regsandpolicies/general-regulations/>) and the Regulations for the programme (above) take precedence over other information sources such as student handbooks if there is a conflict. If there is a conflict between General Regulations and Programme Regulations then General Regulations take precedence unless an exemption has been approved.

This specification provides a concise summary of the main features of the programme and the threshold learning outcomes that a student might normally be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. **The individual modules included in the programme may differ from those included in this programme specification as our programmes are subject to continuous review.** Information on admissions requirements and career opportunities is available in the relevant prospectus. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the appropriate module guides and programme handbook(s) which are available to students on enrolment.