

Faculty: **Science, Technology and Creative Arts**

Title of Programme: MEng Electronic and Communications Engineering

Programme Code: EIMENGE

Programme Specification

Start Date: September 2011

Date of Approval: 23 March 2011

Associate Dean (Academic Quality): Petros Khoudian



Signature

Programme Specification

MEng in Digital Communications and Electronics

MEng in Digital Systems and Computer Engineering

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 Award	MEng
All Final Award titles	Digital Communications and Electronics Digital Systems and Computer Engineering
FHEQ level of award	7
UCAS code(s)	H646, H654

A. Programme Rationale

The School of Engineering and Technology offers a variety of MEng/BEng degrees. This programme specification covers those under the banner of Electronic and Communication Engineering. The programme has been developed to (i) satisfy the QAA Engineering Benchmark requirements (ii) to fulfill the initial academic requirements of UK-SPEC for CEng status and (iii) meet the professional employment needs of industry.

Initially students study a relatively common portfolio of modules covering a broad range of topics necessary for professional Engineering allowing flexibility for students to change their award pathway as they become more familiar with the opportunities available. The differentiating features of the various awards are progressively introduced as the students progress.

The additional study involved in the MEng award in comparison with a BEng Honours award aims to provide the opportunity to develop the potential to be a leader in the engineering profession and within the engineering industry. At the same time, greater subject specialism is allowed for by providing further study of the chosen engineering discipline.

BEng Students with a sufficient level of achievement during levels 4 and 5 are encouraged to consider transfer to the MEng programme.

The School has close contacts with a wide range of engineering companies and students are encouraged to take the sandwich option spending at least 48 weeks on industrial placement between levels 5 and 6.

MEng graduates can expect to gain employment across a wide range of industries that require the skills of an electronic engineer. These industries include communications, computing, manufacture, defense, aerospace and automotive. MEng graduates can expect to gain rapid promotion into positions of responsibility within industry. Alternatively some graduates may wish to extend their studies by taking a research based award.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's general educational aims of programmes of study as set out in UPR TL01.

Additionally this programme aims to:

- provide a high quality education in engineering giving technical breadth and depth beyond BEng Honours level;
- provide an education for the individual which enhances his/her prospects of professional employment in engineering and business both in national and international industries in a leadership capacity;
- provide studies which are accredited by one or more of the Professional Engineering institutions;
- provide studies which develop a depth of knowledge and understanding of a broad range of Electrical & Electronic Engineering areas of expertise;
- provide studies which enable the student to attain a high level of expertise in a range of topics specific to their named award:
 - Digital Communications and Electronics students will particularly study modern digital aspects of communications.
 - Digital Systems and Computer Engineering students will particularly study digital and computer hardware, software and the hardware-software interface, including an insight into software engineering and methodologies.

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 to the QAA benchmark statements for Engineering and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008), and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education 2003 have been used as a guiding framework for curriculum design.

Knowledge and Understanding of:	Teaching/learning methods & strategies	Assessment
A1-The analytical methods employed by the student's chosen engineering discipline. A2- The engineering sciences appropriate to the student's chosen engineering discipline. A3-The design principles and design-to-build processes appropriate to the student's chosen engineering discipline. A4- The principles and environmental/ethical considerations of the business and management of engineering.	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 levels 6 and 7. Acquisition of A3, A4 and A5 is through a combination of lectures, projects and coursework throughout the programme.	Knowledge and understanding are assessed through a combination of unseen examinations (A1, A2, A3 and A5) and in-course assessments (A1-A5) 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 and 7 some aspects of A5 are assessed by case study reports.

<p>A5-Professional engineering practice appropriate to the student's chosen engineering discipline.</p>	<p>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.</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>Intellectual skills - able to:</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment</p>
<p>B1- Analyse and solve engineering problems using appropriate techniques. B2-Model and analyse relevant engineering systems. B3-Select appropriate computer based methods for engineering and communication. B4-Fully evaluate external influences on the design process. B5- Innovatively design appropriate 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 levels 6 and 7.</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>B1, B2 and B5 are assessed through unseen examination papers, laboratory reports and coursework related to in-course exercises.</p> <p>B3 and B4 are assessed through project reports and presentations.</p>

Practical skills - able to:	Teaching/learning methods & strategies	Assessment
<p>C1-Apply analytical and modelling techniques to solve problems appropriate to the student's chosen engineering discipline.</p> <p>C2-Perform experimental work, and draw conclusions.</p> <p>C3-Use computer-based engineering tools.</p> <p>C4-Prepare technical documentation.</p> <p>C5-Critically evaluate the design of systems, components or processes appropriate to the student's chosen engineering discipline.</p> <p>C6-Plan and manage a project, taking into account technical, commercial and industrial 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 software documentation, particularly at level 4.</p> <p>C5 is developed through lab and project work at levels 5, 6 and 7.</p> <p>C6 is developed through lectures and project work.</p> <p>Feedback is given to all students on all coursework produced.</p>	<p>Practical skills are assessed through laboratory reports, coursework assignments, design exercise submissions, case study reports, presentations and project reports.</p>
Transferable skills - able to:	Teaching/learning methods & strategies	Assessment
<p>D1-Communicate effectively, both orally and in writing.</p> <p>D2-Use commonly available IT tools.</p> <p>D3-Manage time and resources effectively.</p> <p>D4-Work effectively within a team as a member or in a leadership role.</p> <p>D5-Manipulate, sort and present data.</p> <p>D6-Solve problems in a logical manner.</p> <p>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.</p> <p>D1 is developed through feedback on coursework reports, oral presentations and project reports.</p> <p>D2 is developed through their use in preparing project reports, laboratory reports, case studies, design work, etc.</p> <p>D3 is developed through project work planning and throughout the programme.</p>	<p>Transferable skills are assessed through the following approaches.</p> <p>D1, D2, D5 and D6 are assessed through coursework, individual major project and technical reports, and oral presentations.</p> <p>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 major project work.</p>

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.

Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.

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

The programme is offered in full-time (4 years), sandwich (5 years) or part-time (8 years) modes, and in all cases leads to the award of an MEng Degree. Entry is normally 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). Direct entry into Level 6 is also possible, for example following successful completion of two years of a similar BEng or MEng degree programme at another HE institution. It is possible for a BEng Honours student to transfer to the MEng in Engineering provided they have passed the MEng progression requirements for the level they wish to study at. A student who fails to meet the progression requirements to enter the final year of the programme, or wishes to leave at this stage for any other reason, will be eligible for the award of BEng Honours as an exit award.

Professional and Statutory Regulatory Bodies

The programme is accredited by the Institution of Engineering and Technology.

Work-Based Learning, including Sandwich Programmes

A designated sandwich programme leads to a University award in the sandwich mode and the word "sandwich" appears on the award certificate. In order for the BEng to lead to an award in the sandwich mode, the student must undertake a period of approved work experience (industrial placement) of not less than 48 weeks, excluding holidays, during year 3. To achieve this, students must start their work experience before 1st October. The work experience will normally be completed within the United Kingdom but with approval may be completed within other countries. Progress of the student's training is monitored by visits from University academic staff. Students will be required to document this period of work in accordance with the guidelines produced by the Faculty. Students on industrial placement will be registered on the Placement Year Module (6AAD0015).

Students who have not achieved the minimum progression requirements at the end of level 5 may be prevented from undertaking a sandwich placement. The policy relating to progression onto the placement year from Level 5 is given in the Faculty Guidelines on Industrial Placements. Additionally, students on industrial placement but who have level 4 or 5 modules to repeat, will not normally be allowed to re-enrol on these modules until they return from industrial placement. This is to avoid a conflict between UH attendance requirements and the student's commitment to their employer.

Students who do not take the sandwich option, progressing directly to level 6, are automatically transferred to the full-time mode and are required to complete a Careers Portfolio to demonstrate their employability skills (6ENT1021). This portfolio will include evidence of any employment experiences the student has, evidence of any voluntary work experience, an audit of their employability skills and a careers action plan to further their employability skills post graduation. It is expected that much of this evidence will have been gathered during the Career Skills Development module (4AAD0028) and Career Planning module (5AAD0032).

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 (in section 2) identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

Mode of study:

The modes of study are Full Time: 4 years; Sandwich: 5 years and Part-time: 8 years

Entry point: Semester A

Level 4

Following notations should be read in conjunction with table below:

Digital Communications and Electronics = MENGDCCE, Digital Systems and Computer Engineering = MENGDSCE.

c = compulsory module

o = optional module

Module Title	Module Code	Award		Credit Points	% examination	% coursework	Semester	Year of Study	
		MENGDCCE	MENGDSCE					Full Time Mode	Part Time Mode
Career Skills Development	4AAD0028	c	c	0	-	100	AB	1	1
Engineering Mathematics	4PAM1007	c	c	15	80	20	A	1	1
Introduction to Electronic Systems	4ENT1028	c	c	15	-	100	A	1	1
Sustainable Business of Electronics	4ENT1037	c	c	15	-	100	A	1	2
Digital Electronics & Computer Organisation	4ELE0050	c	c	15	80	20	A	1	2
Engineering Applications of Mathematics	4PAM1008	c	c	15	-	100	B	1	1
Electrical and Electronic Theory	4ENT1026	c	c	15	80	20	B	1	1
Electronic Engineering Practice	4ELE0041	c	c	15	-	100	B	1	2
Computer Programming for Electronics Engineers	4ELE0049	c	c	15	-	100	B	1	2

- Progression to level 5 of MEng requires a minimum of 120 credits with an average of 60%.
- Progression to level 5 of BEng requires a minimum of 90 credits to remain on honours award.
- Progression to non-honours level 5 with 75 credits may be permissible. The maximum study rate in such an instance would normally be 120 credits but students would be expected to remedy any failed modules from level 4 in the first instance.

Level 5

Following notations should be read in conjunction with table below:

Digital Communications and Electronics = MENGDCCE, Digital Systems and Computer Engineering = MENGDSCE.

c = compulsory module

o = optional module

Module Title	Module Code	Award		Credit Points	% examination	% coursework	Semester	Year of Study	
		MENGDCCE	MENGDSCE					Full Time Mode	Part Time Mode
Further Engineering Mathematics	5PAM1005	c	c	15	70	30	A	2	3
Digital Design and Embedded Systems	5ELE0060	c	c	15	70	30	A	2	3
Real-time Systems & Programming	5ELE0062	c	c	15	-	100	A	2	4
Electronic Communication Systems	5ELE0061	c	c	15	70	30	A	2	4
Project Management and Product Development	5ENT1024	c	c	15	70	30	B	2	3
Electrical Engineering and Power Control	5ELE0058	c	c	15	70	30	B	2	3
Data Acquisition and Control Systems	5ENT1021	c	c	15	-	100	B	2	4
Mini Projects (Communications)	5ELE0064	c	-	15	-	100	B	2	4
Mini Projects (Digital Systems)	5ELE0065	-	c	15	-	100	B	2	4
Career Planning	5AAD0032	c	c	0	-	100	AB	2	4

- Progression to level 6 of MEng requires a minimum of 240 credits with an average of 60% at level 4 and 5.
- Progression to level 6 of BEng Honours requires 210 credit points and above at level 4 and 5.
- Progression to non-honours level 6 with 180 credits may be permissible. The maximum study rate in such an instance would normally be 120 credits but students would be expected to remedy any failed modules from level 5 in the first instance.

- **Level 6**

Following notations should be read in conjunction with table below:

Digital Communications and Electronics = MENGDCCE, Digital Systems and Computer Engineering =MENGDSCE.

c = compulsory module.

o = optional module. All students who do not take the Placement Year module must take the Careers Portfolio module in year 4.

Module Title	Module Code	Award		Credit Points	% examination	% coursework	Semester	Year of Study	
		MENGDCCE	MENGDSCE					Full Time Mode	Part Time Mode
Placement Year	6AAD0015	o	o	0	-	100	ABC	3	-
Careers Portfolio	6ENT1021	o	o	0	-	100	A	4	5
Microelectronics & VLSI	6ELE0068	c	c	15	60	40	A	4	5
Digital Signal Processing	6ELE0066	c	c	15	60	40	A	4	5
Mobile & Digital Communication Networks	6ELE0069	c	c	15	60	40	A	4	6
Intelligent Systems and Robotics	6ELE0067	-	c	15	60	40	B	4	5
Optical Communication Systems	6ELE0072	c	-	15	60	40	B	4	5
Satellite Terrestrial Communication Systems	6ENT1014	c	-	15	-	100	B	4	6
Computer Architecture	6ELE0084	-	c	15	60	40	B	4	5
Operating Systems & Object Oriented Programming	6ELE0070	-	c	15	60	40	B	4	6
Telecommunication Systems	6ELE0074	c	-	15	60	40	B	4	5
Individual Major Project	6ENT1013	c	c	30	-	100	AB	4	6

Progression to level 7 requires:

Eligibility for at least an upper second class BEng honours exit award as defined in UPR AS14.

Level 7

Following notations should be read in conjunction with table below:

Digital Communications and Electronics = MENGDCCE, Digital Systems and Computer Engineering = MENGDSCE.

c = compulsory module.

o = optional module.

Module Title	Module Code	Award		Credit Points	% examination	% coursework	Semester	Year of Study	
		MENGDCCE	MENGDSCE					Full Time Mode	Part Time Mode
Successful Project Delivery	7ENT1016	c	c	15	-	100	A	5	8
MEng Team Project	7ENT1024	c	c	45	-	100	AB	5	8
Human Resource Management	7AAD0062	c	c	15	60	40	A	5	7
Wireless, Mobile and Ad-hoc Networking	7COM0184	c	-	15	70	30	A	5	7
Optical Networking Protocols	7ENT1022	c	-	15	60	40	B	5	7
Embedded Aerospace Systems	7AAD0037	c	c	15	-	100	B	5	7
Computer Architecture Design	7ENT1004	-	c	15	60	40	A	5	7
Artificial Intelligence	7ENT1013	-	c	15	60	40	B	5	7

If any of the progression requirements stated above are not met then the Board of Examiners is empowered to require the student to transfer to the BEng (non-Honours) or BEng Honours degree programme. The study pattern for students transferring onto the BEng (non-Honours) route shall be agreed on a case-by-case basis with the BEng Programme Tutor or Associate Head of School.

To be eligible for an MEng award the students must satisfy accumulated 480 credits and satisfactorily complete the Individual Major Project and MEng Team Project.

The MEng award uses an honours classification system as specified in Section D7 of UPR AS14.

If a student at the final board of examiners is not eligible for an MEng Honours classification they will be considered for the highest award available in Table 1b based on their achievement.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Award	Minimum requirements	Available at end of Level
University Certificate	45 credit points at level 4.	4
Certificate of Higher Education	120 credit points at level 4.	4, 5
University Diploma	180 credit points including at least 60 at level 5.	5, 6
Diploma of Higher Education	240 credit points including at least 120 at level 5.	5, 6
Students with an enrolment date before September 2008 will be eligible for BEng in the named award	270 credit points including 180 at level 6/5 of which 90 must be at level 6.	6
Students with an enrolment date of September 2008, or thereafter will be eligible for BEng in the named award	300 credit points including 240 at levels 4 and 5, and 60 credit points excluding the individual major project module at level 6, or 210 at levels 4 and 5 and 90 credit points excluding the individual major project module at level 6.	6
BEng (Hons) in the named award	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Additionally, students must satisfactorily complete an individual major project.	6
BEng (Hons) in the named award (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Additionally, students must satisfactorily complete an individual major project and the Placement Year module.	6
MEng (Hons) in the named award	480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an individual major project and the MEng Team Project.	7
MEng (Hons) in the named award (Sandwich)	480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an individual major project, the MEng Team Project and the Placement Year module.	7

E. Support for students and their learning

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 Tutor and Deputy Programme Tutors;
- student representatives on programme committees;
- Personal Tutors to provide academic and pastoral support;
- a project supervisor;
- computer and technical laboratories facilities and technical support staff;
- a Mathematics Drop-in Centre;

- an Industrial Placements Office, Industrial Placement Tutor and Supervisors;
- Graduate Futures that provide careers advice and workshops to help students enhance their employability skills;
- a substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters etc;
- an Accommodation Office;
- an International Students Centre who organise an Overseas Student Orientation induction programme;
- 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 services;
- a Disabled Student Tutor;
- an Equal Opportunities Officer;
- the Students' Union;
- the facilities and staff of a large well-resourced flying school.

F. Entry requirements

The normal entry requirements for the programme are:

320 UCAS points plus GCSE Maths, English Language and Science grade C or above.

The UCAS points will typically come from:

- 3 A-levels including Maths plus Physics, technology or an engineering based subject. (General Studies/Critical Thinking are not accepted),

or

- BTEC ND DDM Engineering to include Merit in Further Mathematics for Technicians.

Applications are also welcomed from those holding other qualifications including equivalent Scottish Higher or Irish Higher Certificates, International Baccalaureate, and appropriate equivalent international qualifications.

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.

Direct Entry at Second and Final Year

In accordance with University Admissions Policy to allow flexible entry at different levels it may be possible for applicants to enter the programme at second and final year level. In all instances, candidates will be required to discuss their individual circumstances with the appropriate Admissions Tutor.

Students applying for direct entry into Level 5 are required to have an Edexcel HND in an appropriate discipline with merits and distinctions in appropriate subjects which must include Mathematics plus numerate/technical/ physical sciences). Equivalent European and overseas qualifications are also accepted subject to University approval.

Direct entry into level 6 is also possible, for example following successful completion of two years of a similar MEng degree programme at another HE institution.

The programme is subject to the University's Principles, Policies, Regulations and Procedures for the Admission of Students to Undergraduate and Taught Postgraduate Programmes and will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

Section 2

Programme management

JACS code(s)	H6
Modes of study	F/T, Sandwich, P/T
Intakes	A
Relevant QAA subject benchmarking group	Engineering
Date of validation/last periodic review	December 10
Date of production/ last revision of PS	March 11
Relevant intakes	All students from September 2011
Faculty	Science, Technology and Creative Arts
Administrative School(s)/Departments	School of Engineering and Technology

Course (i.e. pathway) details

Course (ie. Pathway Point) Titles	Course (ie. Pathway Point) Codes
MEng Digital Communications & Electronics MEng Digital Communications & Electronics (Part-time)	MDCE1, MDCE2, MDCE3, MDCE4, MDCE5 MENGEP1, MENGEP2, MENGEP3, MENGEP4, MENGEP5, MENGEP6, MENGEP7, MENGEP8
MEng Digital Systems & Computer Engineering MEng Digital Systems & Computer Engineering (Part-time)	MDSCE1, MDSCE2, MDSCE3, MDSCE4, MDSCE5 MENGEP1, MENGEP2, MENGEP3, MENGEP4, MENGEP5, MENGEP6, MENGEP7, MENGEP8

The programme is managed by:

- a Deputy Head of School who has overall responsibility for quality assurance in the school;
- an Associate Head of School who has overall responsibility for Learning & Teaching in the school;
- an Associate Head of School who has overall responsibility for resources in the school;
- a Programme Tutor who is responsible for chairing the programme committee and advising students on the programme as a whole;
- Deputy Programme Tutors who are responsible for the day to day management;
- an Admissions Tutor, with specific responsibility for open days and selection;
- a designated Administrator to deal with day to day administration associated with the programme;
- an Industrial Placements Coordinator to assist with the procurement of placements;
- a programme committee that includes the above plus student representation;
- module leaders who are responsible for individual modules.

Programme-specific assessment regulations

The programme is compliant with the University's generic assessment regulations (Structure and Assessment Regulations for Academic Programmes, UPR AS14) with the exception of those listed below, which have been specifically approved by the University:

- As specified by the accrediting body, a compensated pass cannot be awarded for the Individual Major Project or the MEng Team Project.

Further points of clarification and interpretation relevant to this specific programme are given below:

- in order for the MEng to lead to an award in the sandwich mode, the student must undertake a period of approved work experience (industrial placement) of not less than 48 weeks with no possibility of exemption;
- the programme operates a university-wide policy for treatment of extenuating circumstances.

Other sources of information

- Definitive Module Documents
- Module Guides
- Student Handbook
- Programme Specification website:
(StudyNet → Staff → Department Lists → Academic Quality Office → Programme Management → Programme Specifications)
- University of Hertfordshire Course website:
<http://www.herts.ac.uk/courses/>
- QAA Benchmark Statement website:
<http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp>
- The Framework for Higher Education Qualifications in England, Wales and Northern Ireland, 2008:
<http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI08/default.asp>
- SEEC Credit Level Descriptors for Further and Higher Education 2003:
<http://www.seec-office.org.uk/creditleveldescriptors2003.pdf>
- External Quality Review report website:
http://www.qaa.ac.uk/revreps/inst_reports.asp?instID=H-0060
- Professional or Statutory Regulatory Body information:
www.theiet.org/
- UNISTATS website:
<http://www.unistats.com/>
- University of Hertfordshire Academic Quality website:
(StudyNet → Staff → Department Lists → Academic Quality Office)
- Structure and Assessment Regulations - Undergraduate and Taught Postgraduate Programmes, UPR AS14:
<http://herts.ac.uk/secreg/upr/AS14.htm>
- Learning and Teaching Policy and General Educational Aims, UPR TL01:
<http://herts.ac.uk/secreg/upr/TL01.htm>
- Admissions - Undergraduate and Taught Postgraduate Students, UPR SA03:
<http://herts.ac.uk/secreg/upr/SA03.htm>
- Academic Quality, UPR AS17:
<http://herts.ac.uk/secreg/upr/AS17.htm>
- Index of UPRs for students:
http://www.herts.ac.uk/secreg/upr/upr_azlist_student_info.htm
- A-Z of the University of Hertfordshire – downloadable pdf file from Student Support StudyNet website

Other information relevant to the programme

Full-time students may elect to undertake their level 5 studies at the University of West Virginia (WVU) or Oklahoma State University in the USA in place of the level 5 programme shown in Table 1a. If a student elects to do this, the eventual degree award remains unchanged.

It is awarded by the University of Hertfordshire. The programme of studies undertaken at WVU or Oklahoma State is not identical to that taken at UH, but is deemed to be equivalent. In order to maintain registration with UH, the entire level 5 programme taken at WVU has UH DMD number 5ELE0015X and a credit point rating of 120. Students are registered for this in place of the 8 level 5 modules listed previously. The credits achieved from either WVU or Oklahoma State will be recorded as passed and will have no contribution on honours classification.

University policies relevant to the Programme

The University undertakes to use all reasonable endeavours to deliver, assess and administer this programme in accordance with this Programme Specification. At the same time it is recognised that it is in the nature of academic developments that changes, for example to the structure, curriculum, and assessment of a programme may be necessary in order to ensure that the programme remains up to date, in response to issues raised as a result of on-going monitoring and evaluation, and/or in order to conform to new regulatory requirements imposed by this institution, by professional or statutory bodies, or by national or governmental bodies.

The programme operates within the guidelines and policies relating to equal opportunities and environmental issues which may be agreed from time to time by the Board of Governors and/or the Academic Board of the University.

Where the programme is offered in collaboration with another institution these policies and guidelines will normally be those of the partner institution.

The programme operates in accordance with the University's Regulations Governing Studies Involving the Use of Human Subjects (UPR RE01) agreed from time to time by the Academic Board of the University. However, where the programme is offered in collaboration with another institution (for example through a franchise arrangement for all or part of the programme) then specific approval must be obtained from the University for the operation of the programme within ethical guidelines prepared by the partner institution. The partner institution will be responsible for all insurance liability in connection with the observance of ethical guidelines.



Signed
Chair of Faculty Academic Quality Enhancement Committee

Date 23 March 2011

If you would like this information in an alternative format please contact:

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Table 2: Development of 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.

MEng Digital Communications and Electronics

		Programme Learning Outcomes (as identified in section 1 and the last page)																										
		Knowledge & Understanding					Intellectual Skills					Practical Skills						Transferable Skills										
Module Title	Module Code	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	Engineering Mathematics	4PAM1007	X											X									X	X				
	Engineering Applications of Mathematics	4PAM1008	X											X									X	X				
	Introduction to Electronic Systems	4ENT1028	X	X			X	X					X															
	Sustainable Business of Electronics	4ENT1037				X			X									X	X		X							
	Digital Electronics & Comp. Org.	4ELE0050		X			X				X		X															
	Comp. Prog. for Electronics Eng	4ELE0049		X				X			X	X										X		X				
	Electronic Engineering Practice	4ELE0041			X				X		X			X	X							X						
	Electrical & Electronic Theory	4ENT1026	X	X			X	X						X														
Career Skills Development	4AAD0028					X											X	X	X	X	X	X	X	X				
Level 5	Further Engineering Mathematics	5PAM1005	X																						X			
	Digital Design & Embedded Systems	5ELE0060		X	X					X				X														
	Electronic Communication Systems	5ELE0061	X	X									X	X			X											
	Data Acquisition & Control Systems	5ENT1021		X	X		X	X				X	X				X											
	Project management & Product Dev.	5ENT1024	X		X		X	X			X				X		X	X					X					
	Real-time Systems & Programming	5ELE0062		X			X				X		X				X											
	Electrical Engineering & Power Control	5ELE0058		X			X					X	X				X											
	Mini Projects (Communications)	5ELE0064					X		X	X		X										X	X	X				
	Career Planning	5AAD0032					X											X					X					
	Placement Year	6AAD0015				X	X										X	X	X	X					X			
Level 6	Mobile & Digital Communication Networks	6ELE0069				X					X		X															
	Microelectronics & VLSI	6ELE0068				X					X		X				X											
	Digital Signal processing	6ELE0066				X	X					X	X				X											
	Individual Major Project	6ENT1013					X		X	X					X		X	X	X	X			X	X	X			
	Telecommunication Systems	6ELE0074				X	X					X	X				X											
	Optical Communication Systems	6ELE0072										X	X				X											
	Satellite Terrestrial Communication Systems	6ENT1014				X						X	X				X											
Careers Portfolio	6ENT1021				X													X		X		X		X				
Level 7	MEng Team Project	7ENT1024			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Successful Project Delivery	7ENT1016				X	X				X				X	X	X	X	X	X	X	X	X	X	X			
	Optical Networking Protocols	7ENT1022	X					X			X	X	X	X		X		X										
	Wireless, Mobile & Ad-hoc Networking	7COM0184	X	X	X		X		X	X	X	X	X	X		X		X	X						X			
	Embedded Aerospace Systems	7AAD0037		X	X				X		X		X	X	X			X										
Human Resource Management	7AAD0062				X		X									X												

MEng Digital Systems and Computer Engineering

		Programme Learning Outcomes (as identified in section 1 and the last page)																										
		Knowledge & Understanding					Intellectual Skills					Practical Skills						Transferable Skills										
Module Title	Module Code	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	Engineering Mathematics	4PAM1007	X											X									X	X				
	Engineering Applications of Mathematics	4PAM1008	X											X									X	X				
	Introduction to Electronic Systems	4ENT1028	X	X			X	X					X															
	Sustainable Business of Electronics	4ENT1037				X			X									X	X		X							
	Digital Electronics & Comp. Org.	4ELE0050		X			X				X		X															
	Comp. Prog. for Electronics Eng	4ELE0049		X				X			X	X																
	Electronic Engineering Practice	4ELE0041			X				X		X			X	X					X		X						
	Electrical & Electronic Theory	4ENT1026	X	X			X	X					X															
	Career Skills Development	4AAD0028					X											X	X	X	X	X	X	X	X			
Level 5	Further Engineering Mathematics	5PAM1005	X																					X				
	Digital Design & Embedded Systems	5ELE0060		X	X						X			X														
	Electronic Communication Systems	5ELE0061	X	X									X			X												
	Data Acquisition & Control Systems	5ENT1021		X	X		X	X				X	X			X												
	Project management & Product Dev.	5ENT1024	X		X		X	X			X			X			X	X					X					
	Real-time Systems & Programming	5ELE0062		X			X				X		X			X												
	Electrical Engineering & Power Control	5ELE0058		X			X					X	X			X												
	Mini Projects (Digital Systems)	5ELE0065					X			X	X		X									X	X	X				
	Career Planning	5AAD0032					X												X				X					
Level 6	Placement Year	6AAD0015				X	X									X	X	X	X					X				
	Microelectronics & VLSI	6ELE0068					X				X		X															
	Digital Signal processing	6ELE0066					X	X				X	X			X												
	Mobile & Digital Communication Networks	6ELE0069					X				X		X															
	Individual Major Project	6ENT1013					X		X	X					X		X	X	X	X		X	X	X				
	Intelligent Systems and Robotics	6ELE0067					X	X				X	X			X												
	Computer Architecture	6ELE0084			X			X			X	X	X	X		X												
	Operating Systems & Object Oriented Prog'	6ELE0070					X	X	X		X	X	X	X		X												
	Careers Portfolio	6ENT1021					X											X		X		X		X				
Level 7	MEng Team Project	7ENT1024			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Successful Project Delivery	7ENT1016				X	X				X				X	X	X	X	X	X	X	X	X	X	X			
	Computer Architecture Design	7ENT1004			X		X						X	X	X	X												
	Artificial Intelligence	7ENT1013			X						X		X			X												
	Embedded Aerospace Systems	7AAD0037		X	X					X	X		X	X	X				X									
	Human Resource Management	7AAD0062				X		X									X											

Key to Programme Learning Outcomes

Knowledge and Understanding

- A1. The analytical methods employed by the student's chosen engineering discipline.
- A2. The engineering sciences appropriate to the student's chosen engineering discipline.
- A3. The design principles and design-to-build processes appropriate to the student's chosen engineering discipline.
- A4. The principles and environmental/ethical considerations of the business and management of engineering.
- A5. Professional engineering practice appropriate to the student's chosen engineering discipline.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Model and analyse relevant engineering systems.
- B3. Select appropriate computer based methods for engineering and communication.
- B4. Fully evaluate external influences on the design process.
- B5. Innovatively design appropriate systems, components or processes.

Practical Skills

- C1. Apply analytical and modelling techniques to solve problems appropriate to the student's chosen engineering discipline.
- C2. Perform experimental work and draw conclusions.
- C3. Use computer-based engineering tools.
- C4. Prepare technical documentation.
- C5. Critically evaluate the design of systems, components or processes appropriate to the student's chosen engineering discipline;
- C6. Plan and manage a project, taking into account technical, commercial and industrial constraints.

Transferable Skills

- 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 or in a leadership role.
- D5. Manipulate, sort and present data.
- D6. Solve problems in a logical manner.
- D7. Learn effectively and independently, in all aspects of life.