Programme Specification

Electronic Engineering 2017-18

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

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of Study	Full Time
Duration in Years	3 Years BEng
	4 Years MEng
	5 Years MEng with Industrial Studies
Accreditation details	Currently accredited by The Institution of Engineering and Technology (IET)
Final award	Master of Engineering (MEng)
Name of award	Electronic Engineering
Interim Exit awards	Bachelor of Engineering (BEng)
	Bachelor of Engineering (BEng Ordinary)
	Diploma of Higher Education (DipHE)
	Certificate of Higher Education (CertHE)
FHEQ level of final award	Level 7
UCAS code	H603 MEng Electronic Engineering
	H691 MEng Electronic Engineering with Mobile and Secure Systems
	H611 MEng Electronic Engineering with Nanotechnology
	H641 MEng Electronic Engineering with Wireless Communications
	H680 MEng Electronic Engineering with Photonics
	H6G4 MEng Electronic Engineering with Computer Systems
	H6G7 MEng Electronic Engineering with Artificial Intelligence
	MEng Electronic Engineering with Industrial Studies
	H610 BEng Electronic Engineering
QAA Subject Benchmark or other external reference	Quality Assurance Agency (QAA) Engineering Benchmark
	QAA Framework for Higher Education Qualifications (FHEQ)
	Engineering Council (UK-SPEC)
Programme Lead	Dr Rob Maunder
Date specification was written	01/02/2016
Date specification last updates	07/12/2017

Programme Overview

Brief outline of the programme

Electronic engineering drives the fundamental technologies of today's connected world. Every area of our lives, from medicine and healthcare to industrial applications, global trade, transport, communications, entertainment and security, is dependent on electronic technology. As a result, electronic engineering is now one of the fastest growing job fields in the world and skilled electronic engineers are very much in demand.

At Southampton, we will ensure that you have a thorough grounding in a wide range of technologies. Our project work will enable you to acquire valuable skills in teamwork, project planning, time-management and presentation, applying your learning to design and build problems, and working to a brief. All of these will stand you in good stead as you move into your career. We offer outstanding facilities in our labs and teaching is based on the latest research, ensuring that, at the end of your programme, your skills will be highly regarded by leading employers. All of our programmes have a wide range of courses and modules to choose from, enabling you to specialise in what really interests you and also to work in depth. Our "MEng Electronic Engineering with

Industrial Studies" variant includes a year in industry, giving you additional experience and the opportunity to relate your academic skills and knowledge to contemporary industrial practice. Our "MEng Electronic Engineering with X" specialist variants allow you to develop a greater depth of knowledge and understanding in Mobile and Secure Systems, Nanotechnology, Wireless Communications, Photonics, Computer Systems or Artificial Intelligence, granting you a significant advantage when seeking employment or further studies in the corresponding area of electronic engineering.

Please note: As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration, however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our **Disclaimer** to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's Quality handbook.

Learning and teaching

A range of learning and teaching methods are used on this programme, including:

- Staff-led lectures, demonstrations, laboratories and seminars
- Directed reading
- Student-led seminars and presentations
- Specification, design, analysis, implementation and verification exercises
- Revision for written examinations
- Staff and post-graduate supervision of your research dissertation
- Industrial placements

Assessment

A range of assessment methods are used on this programme to enable students to demonstrate their achievement of the intended learning outcomes, including:

- Written examinations
- In-class tests
- Design exercises
- Programming exercises
- Oral presentations
- Written assessments, including technical reports, literature searches and surveys
- Assessed laboratories and logbook checks
- Group work exercises, presentations and reports

Feedback

A range of feedback methods are used on this programme to enable students to gauge their progress in meeting the intended learning outcomes, including:

- Feedback from personal tutor
- Written feedback for large courseworks
- Instant oral feedback on presentations, tutorials and practical laboratories
- Feedback on the overall class performance in particular modules
- Marked courseworks

Educational Aims of the Programme

The aims of the programme are to:

- Provide you with a sound foundation and to develop the skills, knowledge, and application required for a wide range of professional engineering careers as a high quality practitioner and leader in business, engineering, research and development, and industry,

- Provide coherent and well balanced coverage of theory, design and practical subjects based on mathematics, science and engineering, integrated with business and management,
- Have a flexible academic structure, which is relevant and attractive not only to you, but also to staff and industry and which is responsive to progress and development in technology and the needs of the industrial and academic communities,
- Be at the leading edge of scholarship in electronic engineering,
- Maximise the benefit of an environment in which staff are carrying out internationally competitive and leading research across all aspects of electronics and computer science,
- Provide an environment which contributes towards your personal and professional development and provides a foundation for a wide range of subsequent study and lifelong learning,
- Provide a well-found learning environment with sufficient laboratories containing appropriate equipment and facilities, up-to date CAD tools, and a first class web-site, motivating you towards the practice of engineering,
- Provide a supportive pastoral environment with opportunities for you to participate in social and recreational activities, and
- (For the "MEng Electronic Engineering with Industrial Studies" variant) Provide you with industrial experience, to enable you to relate your academic skills and knowledge to contemporary industrial practice.
- (For each "MEng Electronic Engineering with X" specialist variant) Provide you with specialist knowledge and understanding within your specialisation X, in order to give you a significant advantage when seeking employment or further study within that specialisation.

Programme Learning Outcomes

Knowledge and Understanding

Having successfully completed this programme you will be able to demonstrate knowledge and understanding of:

A1. Underpinning key mathematics and science skills appropriate to electronic and digital systems engineering, both as a method for communicating results, concepts and ideas and as a tool for solving complex problems,

A2. Underpinning principles, methodologies and concepts applicable to electronic and digital systems engineering, as well as their role in historical, current, and future developments and technologies,

A3. Practical, computational and programming skills relating to engineering, and compatible with current industrial practice,

A4. The development and evaluation of possible solutions to engineering problems,

A5. Major issues at the frontiers of engineering research and development, and their possible exploitation to enhance current practices,

A6. Financial, economic, and social factors of significance to engineering, including the broader obligations of engineers to society.

If you are an MEng student, you will also be able to demonstrate knowledge and understanding of:

A7. How established techniques of research and enquiry are used to create and interpret knowledge in electronic and digital systems engineering,

A8. How to make critical evaluations of current research and advanced scholarship in electronics and computing, to evaluate methodologies and to develop critiques of them.

A9. (For the "with Industrial Studies" variant) How to apply your academic skills and knowledge to solving problems in industry.

A10. (For the "with Industrial Studies" variant) The relevance of the learning outcomes listed above to a successful career in industry.

A11. (For the the "with Mobile and Secure Systems" variant) The design and implementation of secure electronic systems that maintain the confidentiality, integrity and authenticity of information, while allowing mobility and interoperability with external wireless networks.

A12. (For the "with Nanotechnology" variant) The underpinning physics of state-of-the-art nanoscale electronic, photonic, fluidic, bio-electronic and electro-mechanical materials and devices, as well as their design and fabrication.

A13. (For the "with Wireless Communications" variant) The characteristics of electromagnetic wave propagation in radio channels, as well as the design and implementation of signal processing techniques, circuits and systems for efficiently and reliably modulating information onto the channel, for the purpose of wireless communication networking.

A14. (For the "with Photonics" variant) The design and fabrication of optical fibres, as well as semiconductor light sources and detectors, and the design and implementation of signal processing techniques, circuits and systems for efficiently modulating information onto the optical fibre, for the purpose of optical communication and other applications of photonics.

A15. (For the "with Computer Systems" variant) The design, synthesis, fabrication and efficient programming of computer systems at a fundamental architectural level.

A16. (For the "with Artificial Intelligence" variant) The design and implementation of state-of-the-art artificial intelligence techniques, with consideration of image processing and computer vision, machine learning, robotic systems, computational biology and finance, as well as complexity.

Teaching and Learning Methods

Programmes are taught mainly through Lectures and Directed Reading. Learning is reinforced through tutorials (in the first two parts), design exercises (in the first two parts), coursework assignments, and project work (both individual and in groups). Outcome A1 is largely taught by self-paced methods (worksheets and in-class tests) in parts 1 and 2, and a satisfactory knowledge and understanding is implicit in your ability to complete the second and third part modules. Outcomes A2, A5-A8 are largely taught through lectured modules with understanding developed through coursework and Laboratories. A substantial body of coursework in part 2 develops outcome A3, and outcome A4 is developed through project supervisions in parts 3 and 4. Outcomes A9 and A10 are reached during the year in industry of the "with Industrial Studies" variant. Outcomes A11-A16 are largely taught in specialist modules in parts 3 and 4, as well as in the part 3 Individual Project. Additionally, some fundamental aspects of some specialisms are introduced in particular modules in parts 1 and 2.

Assessment methods

Knowledge and understanding of each subject (outcomes A1-A3) are assessed mainly through written examinations. Additional forms of assessment include technical reports (outcomes A4-A6), seminar presentations (A7-A8), and project reports (A4-A8). Outcomes A9 and A10 are assessed by a report, which is written during the year in industry of the "with Industrial Studies" variant. Outcomes A11-A16 are assessed within the corresponding specialist modules, as well as with the part 3 individual project.

Subject Specific Intellectual and Research Skills

Having successfully completed this programme you will be able to:

B1. Integrate knowledge of mathematics, science, information technology, businesses context and wider engineering practice, to develop analytical and innovative solutions to engineering problems,

B2. Apply mathematical and computer-based models to critically analyse and evaluate the extent to which designs, products and systems meet the criteria defined for their current use and future developments, taking account of the impact of new and advancing technology to enhance current practice,

B3. Apply in an appropriate manner computer-aided tools in the design process so as to aid understanding of design trade-offs, and recognise capabilities and limitations of computer-based methods for engineering problem solving,

B4. Recognise the professional, legal, moral, ethical, cost, aesthetic, environmental, sustainability, health and safety issues involved in the exploitation of technology and science and be guided by the adoption of appropriate professional, ethical and legal practices,

B5. Assess technical and commercial risks, and take appropriate steps to manage those risks in the context of engineering design and solutions,

B6. Investigate, define, characterise and solve problems through use of literature, systematic analysis and design methods and to tackle non-routine problems in creative and innovative ways,

B7. Exercise awareness of quality systems and management in engineering; (MEng only) requirements and responsibilities of leadership; business and management practices relevant to electronic engineering enterprises.

Teaching and Learning Methods

These intellectual skills are taught mainly through Course- and Project-work, and design exercises. Relevant material is also covered in Lectures, Guest Lectures and (for part four MEng students) Seminars. Skill B1 is developed through Group Project Work in parts 2 and 4. Skill B2 is a consistent theme in the taught technical modules in part 3. Advanced CAD tools (skill B3) are used in laboratory and project work in every part of the degree. Skills B4, B5 and B7 are covered through Professional Issues in part 1 and developed further in parts 3 and 4. Skill B6 is developed through the Individual and Group Project work in parts 2-4.

Assessment methods

In-class tests and Written Examinations (skill B1), Technical Reports (skills B2, B4 and B7), Design Exercises (skill B3), Logbook Checks (skill B4), Design Project Reports and Presentations (skills B4-B7).

Transferable and Generic Skills

Having successfully completed this programme you will be able to:

C1. Use IT facilities including word processing, spreadsheets, browsers and search engines to find technical information,

C2. Effectively present to audiences (orally, electronically or in writing) rational and reasoned arguments that address a given engineering problem or opportunity, including assessment of the impact of new technologies,

C3. Work on a significant technical project both independently and as a member of a design team, managing both the overall task and your contribution to that task, particularly in the MEng programmes,

C4. Understand the need for continuing professional development in recognition of lifelong learning,

C5. Competently manage projects, people, resources and time.

C6. (For the "with Industrial Studies" variant.) Apply the key skills listed above to industrial projects.

Teaching and Learning Methods

General proficiency with IT (skill C1) pervades the degree, and is not specifically taught. Presentations and report-writing (skill C2) are covered in part 1 lectures and practiced throughout the programme. Independent, and group working, and organisational skills (skills C3 and C5) are taught for, and developed by, the Individual and Group Projects. Professional development (skill C4) is covered in lectures.

Assessment methods

Design Exercises and Projects (both Individual and Group), Technical Reports, Project and Seminar Presentations.

Subject Specific Practical Skills

Having successfully completed this programme you will be able to:

D1. Specify, design, and construct electronic circuits, systems and computer software, taking account of commercial and industrial constraints,

D2. Use CAD, simulation, design, and verification tools to aid in the design of systems, and to report and comment on results,

D3. Use test and measurement instrumentation appropriate to the discipline including awareness of measurements accuracy and coverage,

D4. Recognise any risks or safety aspects that may be involved in the operation of systems within a given context,

D5. Search for information related to a design solution and present it for discussion.

Teaching and Learning Methods

Skill D1 is taught and developed through Design Modules and Projects in parts 2-4. Advanced CAD tools (skill D2) are used in laboratory and project work in every part of the degree. Skills D3-D4 are covered in Lectures and Laboratory Sessions in parts 1 and 2. Skill D5 is taught through Lectures and Project Supervisions.

Assessment methods

Design Exercises (skills D1,D2 and D5), Supervised Laboratories (skills D3-D4), Design Projects (skills D4-D5), Technical Reports and Seminar Presentations (skill D5).

Graduate Attributes

Graduate Attributes are the personal qualities, skills and understanding you can develop during your studies. They include but extend beyond your knowledge of an academic discipline and its technical proficiencies. Graduate Attributes are important because they equip you for the challenge of contributing to your chosen profession and may enable you to take a leading role in shaping the society in which you live.

We offer you the opportunity to develop these attributes through your successful engagement with the learning and teaching of your programme and your active participation in University life. The skills, knowledge and personal qualities that underpin the Graduate Attributes are supported by your discipline. As such, each attribute is enriched, made distinct and expressed through the variety of learning experiences you will experience. Your development of Graduate Attributes presumes basic competencies on entry to the University.

There are six Graduate Attributes:

Global Citizenship
Global Citizens recognise the value of meaningful contribution to an interconnected global society and aspire to realise an individual's human rights with tolerance and respect.

Ethical Leadership
Ethical Leaders understand the value of leading and contributing responsibly to the benefit of their chosen professions, as well as local, national and international communities.

Research and Inquiry
Research and Inquiry underpin the formulation of well-informed new ideas and a creative approach to problem resolution and entrepreneurial behaviours

Academic

Academic attributes are the tools that sustain an independent capacity to critically understand a discipline and apply knowledge

Communication Skills

Communication Skills encompass an individual's ability to demonstrate knowledge, and to express ideas with confidence and clarity to a variety of audiences

Reflective Learner

The Reflective Learner is capable of the independent reflection necessary to develop their learning and continuously meet the challenge of pursuing excellence

The following table shows the mapping between the University's Graduate Attributes, and a key subset of the core and compulsory modules that form the degree programme.

Code	Module Title	Global Citizenship	Ethical Leadership	Research and Inquiry	Academic	Communication Skills	Reflective Learner
	Part 1 labs	●	●			●	
COMP3200	Individual Project			●	●	●	●
COMP3219	Engineering Management and Law	●	●				
ELEC3200	Industrial Studies		●		●	●	●
COMP6200	Group Design Project			●	●	●	●

Programme Structure

Typical course content

You will study 60 European Credit Transfer and Accumulation System (ECTS) credit points, in parts 1, 2 and 3, and, if an MEng student, 60 credits in part 4. These credits are at level 4 in the Framework for Higher Education Qualifications (FHEQ) in part 1, mainly at level 5 in part 2, then at level 6 in part 3, and level 7 in part 4. If you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 credit points at level 6. This will qualify you for the award of the enhanced degree.

The main areas addressed in the first two parts are mathematics, physics and semiconductor devices, analogue and digital circuit design, signals and systems, communications and control, programming, software design, development and verification, CAD tools and practical laboratory work. In parts three and four, the core material covers professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. You will also choose from a range of technical options. Many of these are in the specialist areas of Artificial Intelligence, Mobile & Secure Systems, Computer Systems, Nanotechnology, Photonics, and Wireless Communications.

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; and the class size depends on cohort size, which varies from year to year.

Programme details

The programme includes four parts, as well as a year in industry for students in the "with Industrial Studies" variant.

Part I: 60 ECTS credits, all at FHEQ level 4

All modules are core (C) and so are not eligible for compensation.

Module Code	Title	Sem	Credit	
ELEC1206	Electrical Materials and Fields	both	7.5	C
MATH1055	Mathematics for Electronic and Electrical Engineering I	both	7.5	C
ELEC1200	Electronic Circuits	1	7.5	C
ELEC1201	Programming	1	7.5	C
ELEC1202	Digital Systems & Microprocessors	1	7.5	C
ELEC1204	Advanced Programming	2	7.5	C
ELEC1205	Solid State Devices	2	7.5	C
ELEC1207	Electronic Systems	2	7.5	C

Part II: 60 ECTS credit points, all at FHEQ level 5

All modules are compulsory (C).

Module Code	Title	Sem	Credit	
ELEC2212	Electromagnetism for Communications	1	7.5	C
ELEC2220	Control and Communications	1	7.5	C
ELEC2221	Digital Systems and Signal Processing	1	7.5	C
MATH2047	Mathematics for Electrical & Electronic Engineering II	1	7.5	C
ELEC2201	Devices	2	7.5	C

ELEC2204	Computer Engineering	2	7.5	C
ELEC2205	Electronic Design	2	7.5	C
ELEC2216	Advanced Electronic Systems	2	7.5	C

Year in Industry: 30 ECTS credit points, all at FHEQ level 6

Students on the "with Industrial Studies" variant will complete a year at a recognised partner company. This year may be taken between years 2 and 3, or between years 3 and 4 (MEng only). During this year, students must complete one or more projects, as agreed between the partner company and the School. The placement will be assessed by a report and other activities, as described in the module specification (ELEC3200). This module is core, and must be passed for the award of the "with Industrial Studies" degree title, but marks for this module will not contribute to the final degree classification.

Part III: 60 ECTS credit points, all at FHEQ level 6 (except for some language and broadening modules)

All students must take the COMP3200 Individual Project (22.5 credits), which is core and is weighted 7.5 credits in Semester I and 15 in semester II. In addition, students must take certain specified modules, as given in the tables below.

Finally, students should select optional modules to make up the total to 60 credits. Besides COMP3200, COMP3219 and specialised modules, a maximum of 2 other "externally taught" modules (COMPxxxx, OPTOxxxx, UOSMxxxx, FRENxxxx, GERMxxxx, LANGxxxx and MATHxxxx) may be chosen. Students must select a 30:30 credit balance between semesters. Students studying for a specialised "(…)" degree must take at least 15 credits of specialised (S) modules in Pt III and must undertake a project within their specialty.

The various programmes have compulsory (C) and, specialised (S) and optional (O) modules as follows:

Module Code	Title	Credit	Sem	ELB	ELM	ELAI	ELCS	ELMS	ELN	ELOC	ELWC
COMP3200	Individual Project (must be on a topic related to programme specialisation)	22.5	both	C	C	C	C	C	C	C	C
COMP3201	Cyber Security	7.5	1	O	O	O	O	S	O	O	O
COMP3206	Machine Learning	7.5	1	O	O	CS	O	O	O	O	O
COMP3215	Real-time Computing and Embedded Systems	7.5	1	O	O	O	S	S	O	O	O
ELEC3201	Robotic Systems	7.5	1	O	O	S	O	O	O	O	O
ELEC3203	Digital Coding and Transmission	7.5	1	O	O	O	O	O	O	S	CS
ELEC3205	Control System Design	7.5	1	O	O	O	O	O	O	O	O
ELEC3207	Nanoelectronic Devices	7.5	1	O	O	O	O	O	CS	S	O
ELEC3210	Design Studies	7.5	1	O	O	O	O	O	O	O	O
ELEC3218	Signal and Image Processing	7.5	1	O	O	S	O	O	O	O	S
ELEC3221	Digital IC and Systems Design	7.5	1	O	O	O	CS	O	O	O	O
ELEC3222	Computer Networks	7.5	1	O	O	O	S	S	O	O	O
ELEC3223	Introduction to Bionanotechnology	7.5	1	O	O	O	O	O	S	O	O
COMP3219	Engineering Management and Law	7.5	1	O	C	C	C	C	C	C	C
MATH3081	Operational Research	7.5	1	O	O	O	O	O	O	O	O
MATH3083	Advanced Partial Differential Equations	7.5	1	O	O	O	O	O	O	O	O
COMP3212	Computational Biology	7.5	2	O	O	S	O	O	O	O	O
COMP3214	Principles and Practice of Computer Graphics	7.5	2	O	O	O	O	O	O	O	O
COMP3217	Secure Systems	7.5	2	O	O	O	O	CS	O	O	O
ELEC3202	Green Electronics	7.5	2	O	O	O	O	O	S	O	O
ELEC3204	Wireless and Optical Communications	7.5	2	O	O	O	O	O	O	S	S
ELEC3206	Digital Control System Design	7.5	2	O	O	O	O	O	O	O	O
ELEC3208	Analogue and Mixed Signal Electronics	7.5	2	O	O	O	O	O	O	O	O
ELEC3217	Photonics	7.5	2	O	O	O	O	O	S	S	O
ELEC3219	Advanced Computer Architecture	7.5	2	O	O	O	S	O	O	O	O
LANGxxxx	A language module scheduled in the Broadening Horizons slot. The appropriate stage will be selected after assessment by the language school	7.5	either	O	O	O	O	O	O	O	O
MATH3082	Optimization	7.5	2	O	O	O	O	O	O	O	O
MATH3084	Integral Transform Methods	7.5	2	O	O	O	O	O	O	O	O
UOSMxxxx	Any other module from the University's Broadening Horizons programme	7.5	either	O	O	O	O	O	O	O	O

ELB – BEng Electronic Engineering
ELM – MEng Electronic Engineering and MEng Electronic Engineering with Industrial Studies
ELAI – MEng Electronic Engineering with Artificial Intelligence

ELCS – MEng Electronic Engineering with Computer Systems
ELMS – MEng Electronic Engineering with Mobile and Secure Systems
ELN – MEng Electronic Engineering with Nanotechnology
ELOC – MEng Electronic Engineering with Photonics
ELWC – MEng Electronic Engineering with Wireless Communications

Part IV: 60 ECTS credit points, all at FHEQ level 7

All students must take the ELEC6200 Group Design Project (22.5 credits) which is core and is weighted 15 credits in Semester I and 7.5 in semester II. In addition, students must take certain specified modules, as given in the tables below.

Students should note that there are a number of prerequisites for the optional modules which are listed in the module specifications; decisions they made for Pt III may affect their choice. It should also be noted that it may not be possible to run some modules if the number of students registered is very small.

Finally, students should select optional modules to make up the total to 60 credits. Besides COMP6228 and specialised modules, a maximum of 2 other "externally taught" modules (COMPxxxx, OPTOxxxx and MATHxxxx) may be chosen. Students must select a 30:30 credit balance between semesters. Students studying for a specialised "with" degree must take at least 15 credits of specialised (S) modules in Pt IV.

The various programmes have compulsory (C) and, specialised (S) and optional (O) modules as follows:

Module Code	Title	Credit	Sem.	ELM	ELAI	ELCS	ELMS	ELN	ELOC	ELWC
ELEC6200	Group Design Project	22.5	both	C	C	C	C	C	C	C
COMP6202	Evolution of Complexity	7.5	1	O	S	O	O	O	O	O
COMP6204	Software Project Management and Development	7.5	1	O	O	O	O	O	O	O
ELEC6201	Microfabrication	7.5	1	O	O	O	O	S	S	O
ELEC6202	Advanced Memory and Storage	7.5	1	O	O	O	O	S	O	O
ELEC6203	Introduction to MEMS	7.5	1	O	O	O	O	S	O	O
ELEC6204	Microfluidics and Lab-on-a-Chip	7.5	1	O	O	O	O	S	O	O
ELEC6205	Bionanotechnology	7.5	1	O	O	O	O	S	O	O
ELEC6217	Radio Communications Engineering	7.5	1	O	O	O	O	O	O	S
ELEC6230	VLSI Systems Design	7.5	1	O	O	S	O	O	O	O
ELEC6237	Secure Hardware Design	7.5	1	O	O	S	O	O	O	O
ELEC6245	Wireless Networks	7.5	1	O	O	O	S	O	O	S
MATH6141	Numerical Methods	7.5	1	O	O	O	O	O	O	O
OPTO6007	An Introduction to Silicon Photonics	7.5	1	O	O	O	O	O	S	O
OPTO6008	Optical Fibre Technology I	7.5	1	O	O	O	O	O	S	O
OPTO6009	Optical Fibre Technology I I	7.5	1	O	O	O	O	O	S	O
COMP6206	Advanced Computer Vision	7.5	2	O	S	O	O	O	O	O
COMP6208	Advanced Machine Learning	7.5	2	O	S	O	O	O	O	O
COMP6210	Automated Software Verification	7.5	2	O	O	S	S	O	O	O
COMP6212	Computational Finance	7.5	2	O	S	O	O	O	O	O
COMP6228	Individual Research Project	7.5	2	O	O	O	O	O	O	O
ELEC6206	Nanofabrication and Microscopy	7.5	2	O	O	O	O	S	S	O
ELEC6207	Quantum Devices and Technology	7.5	2	O	O	O	O	S	S	O
ELEC6208	MEMS Sensors and Actuators	7.5	2	O	O	O	O	S	O	O
ELEC6209	Practical Applications of MEMS	7.5	2	O	O	O	O	S	O	O
ELEC6210	Biosensors	7.5	2	O	O	O	O	S	O	O
ELEC6212	Biologically-Inspired Robotics	7.5	2	O	S	O	O	O	O	O
ELEC6213	Image Processing	7.5	2	O	S	O	O	O	O	O
ELEC6214	Advanced Wireless Communication Networks and Systems	7.5	2	O	O	O	S	O	O	S
ELEC6216	Personal Multimedia Communications	7.5	2	O	O	O	O	O	O	S
ELEC6227	Medical Electrical and Electronic Technologies	7.5	2	O	O	O	O	O	O	O
ELEC6228	Applied Control Systems	7.5	2	O	O	O	O	O	O	O
ELEC6231	VLSI Design Project	7.5	2	O	O	S	O	O	O	O
ELEC6232	Analogue and Mixed Signal CMOS design	7.5	2	O	O	O	O	O	O	O
ELEC6233	Digital System Synthesis	7.5	2	O	O	S	O	O	O	O
ELEC6234	Embedded Processors	7.5	2	O	O	S	O	O	O	O
ELEC6235	System on Chip Design Project	7.5	2	O	O	S	O	O	O	O
ELEC6242	Cryptography	7.5	2	O	O	O	S	O	O	O
ELEC6252	Future Wireless Techniques	7.5	2	O	O	O	O	O	O	S
MATH6149	Modelling with Differential Equations	7.5	2	O	O	O	O	O	O	O
OPTO6003	Photonic Materials	7.5	2	O	O	O	O	O	S	O

OPTO6004	Metamaterials, Nanophonics and Plasmonics	7.5	2	O	O	O	O	O	S	O
OPTO6010	Advanced Fibre Telecommunication Technologies	7.5	2						S	
OPTO6011	Optical Fibre Sensor Technologies	7.5	2						S	

ELM – MEng Electronic Engineering and MEng Electronic Engineering with Industrial Studies
ELAI – MEng Electronic Engineering with Artificial Intelligence
ELCS – MEng Electronic Engineering with Computer Systems
ELMS – MEng Electronic Engineering with Mobile and Secure Systems
ELN – MEng Electronic Engineering with Nanotechnology
ELOC – MEng Electronic Engineering with Photonics
ELWC – MEng Electronic Engineering with Wireless Communications

Alternatively, semester II of Pt IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, ELEC6247 Group Design Project (Overseas Placement) should be taken instead of ELEC6200 Group Design Project during semester I. In this case, ELEC6247 is core and carries 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 2.

Progression Requirements

The programme follows the University's regulations for Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes and Academic Regulations - Faculty of Physical Sciences and Engineering as set out in the University Calendar.

Intermediate exit points

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS credits	Minimum ECTS Credits required at level of award
Honours degree - BEng (hons)	at least 180	45
Ordinary degree - BEng	at least 150	30
Diploma of Higher Education - DipHE	at least 120	45
Certificate of HE - CertHE	at least 60	45

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations. Students can also access SVE (Southampton Virtual Environment), a virtual Windows University of Southampton desktop that can be accessed from personal devices such as PCs, Macs, tablets and smartphones from any location.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- Central IT support is provided through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library foyer
- Enabling Services offering assessment and support (including specialist IT support) facilities if you have a disability, dyslexia, mental health issue or specific learning difficulties
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- a range of personal support services : mentoring, counselling, residence support service, chaplaincy, health service
- a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- Induction – You will have an induction programme at the start of your programme. Besides covering the usual routine matters, it is especially important for you to be properly registered and to have your computer account set up, since the modules you study are supported by on-line systems. Assessment is also managed on-line, so any delay in registration could be detrimental to your studies. In addition, a diagnostic exercise helps us to assess your strengths and offer advice on how best to focus your efforts in the early stages of your studies.
- Personal tutoring – At the start of your studies, you are allocated a Personal Tutor who you will see regularly. Also there is Senior Tutoring team if your personal tutor is not available.
- Computer workstations, with a range of software, manuals and books, with early to late access through a card-lock mechanism.
- Traditional and wireless local area networks.
- Helpdesk for computer support and programming advice.
- Postgraduate demonstrators, who support programming intensive modules.
- A website with notes for every module.
- The FPSE Student Handbook.

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme
- Acting as a student representative on various committees, e.g. Staff: Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feed back on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty
- Programme validation, normally every five years.
- External examiners, who produce an annual report
- Accreditation/inspection by the Institution of Engineering and Technology
- A national Research Assessment Exercise (our research activity contributes directly to the quality of your learning experience)
- Institutional Review by the Quality Assurance Agency

Your views matter to us. We have a high reputation for quality of delivery, and we aim to keep it that way. The most important form of feedback comes through direct, personal contact, and we encourage you to talk to us if anything becomes a concern at any stage. If you find it difficult to talk directly to the member of staff with whom you have immediate contact, you are encouraged to talk to someone else in the teaching team, the Senior Tutor, or the School's Student Services Office, but we do encourage you to talk about it immediately. In addition, there is always a formal evaluation of each module by questionnaire at the end of the semester. These questionnaires are analysed and peer reviewed, and must be responded to formally, both to you and to the University. We also hold Student-Staff Liaison Committee meetings at least twice a year. Anyone is welcome to these meetings, but depending on the circumstances, it may be more effective to elect programme representatives who will make your views known. This then enables you to have an element of anonymity should you be embarrassed in any way about the idea of speaking up.

Criteria for admission

The University's Admissions Policy applies equally to all programmes of study. The following are the typical entry criteria to be used for selecting candidates for admission. The University's approved equivalencies for the requirements listed below will also be acceptable.

Undergraduate programmes

Qualification	Grades	Subjects required	Subjects not accepted	EPQ Alternative offer (if applicable)	Contextual Alternative offer (if applicable)
GCE A level	AAA(BEng) A*AA(MEng)	Maths and Physics (Physics may be substituted by Further Mathematics, Computer Science, or Electronics)	General Studies or Critical Thinking	N/A	Considered on an individual basis

Qualification	Grade/GPA	Subjects requirements			Specific requirements
GCSE (Required to support higher qualifications, e.g. A Levels)	C	English and Maths			
BTEC	Considered on an individual basis				Considered on an individual basis
International Baccalaureate	36 points overall with 18 at Higher Level (BEng) 38 points overall with 18 at Higher Level (MEng)	6 in Maths, 6 in Physics at HL (BEng) 6 in Maths, 6 in Physics at HL (MEng)			Considered on an individual basis

Postgraduate programmes

Qualification	Grade/GPA	Subjects requirements	Specific requirements
Bachelor's degree	N/A	N/A	N/A
Master's degree	N/A	N/A	N/A

Mature applicants

Applications from mature students (over 21 years in the October of the year of entry) are welcome. Applications will be cosidered on an individual basis.

English Language Proficiency

Overall	Reading	Writing	Speaking	Listening
6.5	5.5	5.5	5.5	5.5

Transfer policy

Electronic Engineering (EL) and Electrical & Electronic Engineering (EEE) have higher entry requirements than Electrical Engineering (EE) and Electromechanical Engineering (EM). Likewise, MEng programmes have higher entry requirements than BEng programmes. Part 1 of the above-listed programmes are identical, with the

exception that EL students take ELEC1204 Advanced Programming, while EE and EM students take ELEC1203 Mechanics and while EEE students have the choice of either ELEC1203 or ELEC1204. Parts 1 and 2 of BEng programmes are identical to those of the corresponding MEng programmes, but they diverge in part 3. These issues impose complications upon transfers between these programmes, which are resolved as follows.

Students who are thinking about transferring between EL, EEE, EE and EM are encouraged to discuss this with their academic tutors at the earliest possible opportunity. Transfers between these programmes can be arranged at any time, at the discretion of the programme leader of the destination programme. Additionally, the programme leaders will guarantee transfers between BEng EL, EEE, EE and EM at the end of part 1, for students that have passed that part with an overall average (before referral marks are capped) of at least 58% (without rounding up). Likewise, the programme leaders will guarantee transfers between MEng EL, EEE, EE and EM at the end of part 1, for students that have met the same criterion. However, students seeking transfer to EM will also need to have taken ELEC1203, in order to meet this criterion. Students seeking transfer to EE will not need to have taken ELEC1203, in order to meet this criterion, although in this case they are advised to study the topics of ELEC1203 during the summer before beginning part 2. Likewise, students seeking transfer to EL will not need to have taken ELEC1204, in order to meet this criterion, although in this case they are advised to study the topics of ELEC1204 during the summer before beginning part 2.

Similarly, students who are thinking about transferring between BEng and MEng programmes are encouraged to discuss this with their academic tutors at the earliest possible opportunity. Transfers between BEng and MEng programmes can be arranged at any time, at the discretion of the programme leader of the destination programme. Additionally, the programme leaders will guarantee transfers between BEng and MEng programmes at the end of part 2, for students that have passed that part with an overall average (before referral marks are capped) of at least 58% (without rounding up).

Career Opportunities

Major employers worldwide are keen to employ our graduates – in system development, information technology and communications in the IT sector, and in the finance, service, communications and entertainment industries. We have strong relationships with employers, run our own Careers Hub website (www.ecs.soton.ac.uk/careers) and hold our own annual careers fair.

External Examiners(s) for the programme

Parts 1 and 2
Name: Jan Maciejowski
Institution: University of Cambridge

Parts 3 and 4
Name: Chris Baber
Institution: University of Birmingham

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.
External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook (or other appropriate guide) or online at (give URL).

Appendix 1:

Module Code	Module Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
										Knowledge and Understanding								Subject Specific Intellectual Skills							Transferable/Key Skills						Subject Specific Practical Skills				
ELEC1206	Electrical Materials and Fields	o											o	o	o										o								o	o	
MATH1055	Mathematics for Electrical & Electronic Engineering I	o																							o										
ELEC1200	Electronic Circuits		o		o													o	o		o	o			o		o		o		o	o	o	o	
ELEC1201	Programming			o	o										o						o	o			o		o		o		o		o	o	
ELEC1202	Digital Systems & Microprocessors			o	o	o									o				o	o		o	o		o		o		o		o	o	o	o	
ELEC1204	Advanced Programming			o											o										o										
ELEC1205	Solid State Devices	o								o		o													o								o	o	
ELEC1207	Electronic Systems		o										o	o					o						o								o	o	
ELEC2212	Electromagnetism for Communications	o											o	o											o										
ELEC2220	Control and Communications			o									o	o					o	o					o							o	o	o	
ELEC2221	Digital Systems and Signal Processing			o									o		o				o						o								o	o	
MATH2047	Mathematics for Electrical & Electronic Engineering II	o																							o										
ELEC2201	Devices	o										o													o								o	o	
ELEC2204	Computer Engineering		o													o			o	o					o								o	o	
ELEC2205	Electronic Design			o	o		o											o	o	o	o	o	o		o	o	o		o		o	o	o	o	o
ELEC2216	Advanced Electronic Systems	o																	o	o					o								o	o	o
ELEC3200	Year in Industry							o	o																o				o						
COMP3200	Individual Project				o	o		o	o			o	o	o	o	o	o	o			o	o	o		o	o	o		o		o				o
COMP3201	Cyber Security											o													o										
COMP3206	Machine Learning															o									o										
COMP3215	Real-time Computing and Embedded Systems											o				o			o	o					o								o	o	
ELEC3201	Robotic Systems															o			o	o					o								o		
ELEC3203	Digital Coding and Transmission													o	o				o						o										
ELEC3205	Control System Design																		o						o										
ELEC3207	Nanoelectronic Devices												o		o				o	o					o								o		
ELEC3210	Design Studies			o	o		o											o	o	o	o	o	o		o	o	o		o		o	o	o	o	o
ELEC3218	Signal and Image Processing												o		o				o						o										
ELEC3221	Digital IC and Systems Design														o				o	o					o								o		
ELEC3222	Computer Networks		o									o				o			o						o			o							
ELEC3223	Introduction to Bionanotechnology					o						o							o						o								o		
COMP3219	Engineering Management and Law				o																o		o	o		o			o						
MATH3081	Operational Research	o																							o										
MATH3083	Advanced Partial Differential Equations	o																							o										
COMP3212	Computational Biology															o									o										
COMP3214	Principles and Practice of Computer Graphics			o																					o										
COMP3216	Safety-Critical Systems											o													o										
COMP3217	Secure Systems											o													o										
ELEC3202	Green Electronics												o						o						o										
ELEC3204	Wireless and Optical Communications													o	o				o	o					o								o		
ELEC3206	Digital Control System Design																		o						o										
ELEC3208	Analogue and Mixed Signal Electronics																		o	o					o								o		
ELEC3217	Photonics												o		o				o						o										
ELEC3219	Advanced Computer Architecture															o			o	o					o								o		
MATH3082	Optimization	o																	o	o					o								o		
MATH3084	Integral Transform Methods	o																							o										

Module Code	Module Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
										Knowledge and Understanding								Subject Specific Intellectual Skills							Transferable/Key Skills						Subject Specific Practical Skills				
ELEC6200	Group Design Project					o							o						o						o										
ELEC6247	Group Design Project (Overseas Placement)					o							o						o						o										
COMP6202	Evolution of Complexity															o									o										
COMP6204	Software Project Management and Development				o																				o										
ELEC6201	Microfabrication												o		o				o						o										
ELEC6202	Advanced Memory and Storage												o						o						o										
ELEC6203	Introduction to MEMS												o						o						o									o	
ELEC6204	Microfluidics and Lab-on-a-Chip					o							o						o						o									o	
ELEC6205	Bionanotechnology					o							o						o						o									o	
ELEC6217	Radio Communications Engineering													o					o	o					o								o	o	
ELEC6230	VLSI Systems Design				o											o		o	o	o			o		o		o		o		o	o	o		
ELEC6237	Secure Hardware Design				o											o		o	o	o			o		o		o		o		o	o	o		
ELEC6245	Wireless Networks										o		o						o						o	o		o							o
MATH6141	Numerical Methods	o																							o										
OPTO6007	An Introduction to Silicon Photonics														o										o										
OPTO6008	Optical Fibre Technology I														o										o										
OPTO6009	Optical Fibre Technology II														o										o										
COMP6206	Advanced Computer Vision															o									o										
COMP6208	Advanced Machine Learning					o										o									o										
COMP6210	Automated Software Verification											o				o			o	o					o								o		
COMP6212	Computational Finance					o										o			o	o					o								o		
COMP6228	Individual Research Project					o		o	o														o		o	o	o		o						o
ELEC6206	Nanofabrication and Microscopy												o		o				o						o										
ELEC6207	Quantum Devices and Technology					o							o		o				o						o										
ELEC6208	MEMS Sensors and Actuators												o						o						o										
ELEC6209	Practical Applications of MEMS					o							o						o	o					o								o	o	
ELEC6210	Biosensors					o							o						o						o									o	
ELEC6212	Biologically-Inspired Robotics															o			o				o		o	o	o		o						o
ELEC6213	Image Processing															o			o						o										
ELEC6214	Advanced Wireless Communication Networks and Systems											o		o					o						o										
ELEC6216	Personal Multimedia Communications													o					o						o	o		o							o
ELEC6227	Medical Electrical and Electronic Technologies					o													o						o										
ELEC6228	Applied Control Systems																		o						o	o									o
ELEC6231	VLSI Design Project				o											o		o	o	o			o		o		o		o		o	o			
ELEC6232	Analogue and Mixed Signal CMOS design																		o	o					o								o		
ELEC6233	Digital System Synthesis														o				o	o					o								o		
ELEC6234	Embedded Processors														o				o	o					o								o		
ELEC6235	System on Chip Design Project				o											o		o	o	o			o		o		o		o		o	o			
ELEC6242	Cryptography											o							o						o										
ELEC6252	Future Wireless Techniques													o					o						o										
MATH6149	Modelling with Differential Equations	o																							o										
OPTO6003	Photonic Materials														o										o										
OPTO6004	Metamaterials, Nanophonics and Plasmonics														o										o										
OPTO6010	Advanced Fibre Telecommunication Technologies														o										o										
OPTO6011	Optical Fibre Sensor Technologies														o										o										

Module Code	Module Title	Coursework 1	Coursework 2	Coursework 3	Coursework 4	Exam
ELEC1206	Electrical Materials and Fields	20% - Practical Lab Sessions	5% - Semester 1 coursework			25% - Exam, 1 hour(s) 50% - Exam, 2 hour(s)
MATH1055	Mathematics for Electronic and Electrical Engineering I	20% - Coursework mark generated from 18 tests at end of each weekly topic.				10% - Exam, 1 hour(s) 70% - Exam, 2 hour(s)
ELEC1200	Electronic Circuits	20% - Practical Lab Sessions	15% - Lab project	30% - Problem Sheets	35% - In Class Test	
ELEC1201	Programming	20% - Practical Lab Sessions: C Programming	25% - Practical Lab Sessions: Embedded C Programming	15% - Project	40% - Two in-class tests.	
ELEC1202	Digital Systems & Microprocessors	20% - Practical Lab Sessions	10% - Design Exercise	10% - Problem Sheets		60% - Exam, 2 hour(s)
ELEC1204	Advanced Programming	30% - Practical Lab Sessions	30% - Collaborative Project			40% - Exam, 1.5 hour(s)
ELEC1205	Solid State Devices	20% - Practical Lab Sessions	10% - Coursework Assignment			70% - Exam, 2 hour(s)
ELEC1207	Electronic Systems	20% - Practical Lab Sessions	10% - Coursework Assignment			70% - Exam, 2 hour(s)
ELEC2212	Electromagnetism for Communications	5% - Practical Lab	5% - Coursework assignment	5% - Coursework assignment		85% - Exam, 2 hour(s)
ELEC2220	Control and Communications	15% - Practical Lab Sessions	10% - Coursework assignment			75% - Exam, 2 hour(s)
ELEC2221	Digital Systems and Signal Processing	15% - Practical Lab Sessions	15% - Coursework			70% - Exam, 2 hour(s)
MATH2047	Mathematics for Electrical & Electronic Engineering II	20% - Coursework				80% - Exam, 2 hour(s)
ELEC2201	Devices	5% - Practical Lab Sessions	10% - Coursework			85% - Exam, 2 hour(s)
ELEC2204	Computer Engineering	20% - Practical Lab Sessions	5% - In Class Test			75% - Exam, 2 hour(s)
ELEC2205	Electronic Design	30% - D2 Integrated circuit design exercise	20% - D3 Analogue circuit design exercise	50% - D4 System design exercise		
ELEC2216	Advanced Electronic Systems	10% - Practical Lab Sessions	10% - Coursework			80% - Exam, 2 hour(s)
ELEC3200	Year in Industry	100% - Project report				
COMP3200	Individual Project	10% - Progress Report	80% - Final Report	10% - Viva		
COMP3201	Cyber Security	5% - Coursework Assignment Identify faults in web based security	20% - Coursework Assignment Identify and fix faults in web based security			75% - Exam, 2 hours
COMP3206	Machine Learning	30% - 3 x small courseworks	20% - Large coursework			50% - Exam, 2 hours
COMP3215	Real-time Computing and Embedded Systems	30% - Real-time laboratories				70% - Exam, 2 hours
ELEC3201	Robotic Systems	25% - Kinematic design and analysis of robotic systems				75% - Exam, 2 hours

ELEC3203	Digital Coding and Transmission					100% - Exam, 2.5 hours
ELEC3205	Control System Design	20% - 4 problem sheets				80% - Exam, 2 hours
ELEC3207	Nanoelectronic Devices	30% - SILVACO finite element simulation				70% - Exam, 2 hours
ELEC3210	Design Studies	50% - Design thinking exercise	50% - Design study			
ELEC3218	Signal and Image Processing					100% - Exam, 3 hours
ELEC3221	Digital IC and Systems Design	10% - L-Edit Gate Design	10% - Digital Systems Design			80% - Exam, 2.5 hours
ELEC3222	Computer Networks	40% - Group coursework				60% - Exam, 2 hours
ELEC3223	Introduction to Bionanotechnology	30% - Assignment				70% - Exam, 2 hours
COMP3219	Engineering Management and Law	33% - Formative coursework assessing Accounting for Engineering Decision Making	33% - Summative computer mediated testing assessing Law in Engineering	33% - Formative coursework assessing Managerial Decisions, Marketing, Human Resource Management and Entrepreneurship		
MATH3081	Operational Research	20% - Group Coursework assignment				80% - Exam, 2 hours
MATH3083	Advanced Partial Differential Equations	20% - Coursework				80% - Exam, 2 hours
COMP3212	Computational Biology	30% - short assignments	40% - major assignment	30% - Best two of three in-class quizzes		
COMP3214	Principles and Practice of Computer Graphics	10% - Two 3 hour labs introducing low level 2D and basic 3D Computer Graphics	10% - Introduction to OpenGL coursework	5% - Introduction to physics based modeling coursework	25% - 3D world Simulation, using OpenGL and modeling where appropriate	50% - Exam, 1.5 hours
COMP3216	Safety-Critical Systems	30% - Coursework				70% - Exam, 2 hours
COMP3217	Secure Systems	80% - Labs				20% - Exam, 1 hour
ELEC3202	Green Electronics	30% - Photo-voltaic exercise				70% - Exam, 2 hours
ELEC3204	Wireless and Optical Communications	5% - Space time coding parametrisation and design in Matlab	5% - OFDM parametrisation and design in Matlab	5% - Modelling of material and fibre dispersion in Matlab		85% - Exam, 2.5 hours
ELEC3206	Digital Control System Design					100% - Exam, 2 hours
ELEC3208	Analogue and Mixed Signal Electronics	10% - Analogue Circuit Design coursework				90% - Exam, 2 hours
ELEC3217	Photonics					100% - Exam, 2.5 hours
ELEC3219	Advanced Computer Architecture	35% - Architecture simulation				65% - Exam, 2 hours
MATH3082	Optimization	20% - Coursework				80% - Exam, 2 hours
MATH3084	Integral Transform Methods	20% - Coursework				80% - Exam, 2 hours
ELEC6200	Group Design Project	50% - Group Report	10% - Group Presentation	10% - Individual Reflection	30% - Individual Report and Poster on Business Case Study	
ELEC6247	Group Design Project	70% - Group Report	15% - Group	15% - Individual		

	(Overseas Placement)		Presentation	Reflection		
COMP6202	Evolution of Complexity	0% - code a genetic algorithm	50% - reimplement a selected paper and extend			50% - Exam, 1.5 hours
COMP6204	Software Project Management and Development	25% - Project Management Plan				75% - Exam, 2 hours
ELEC6201	Microfabrication	30% - Fabrication report				70% - Exam, 2 hours
ELEC6202	Advanced Memory and Storage	50% - Advanced memory device and lab report				50% - Exam, 2 hours
ELEC6203	Introduction to MEMS	30% - laboratory report				70% - Exam, 2 hours
ELEC6204	Microfluidics and Lab-on-a-Chip	30% - Report on simulation laboratory and technology review				70% - Exam, 2 hours
ELEC6205	Bionanotechnology	30% - laboratory report				70% - Exam, 2 hours
ELEC6217	Radio Communications Engineering	5% - Software defined radio exercise	15% - Matlab simulation	50% - Transceiver System Design (group exercise)		30% - Exam, 1 hour
ELEC6230	VLSI Systems Design	10% - Mini design assignment with electronic submission of designs (modulated by lab performance)	20% - Mini design assignment with electronic submission of designs (modulated by lab performance)	35% - Design assignment with formal documentation (modulated by lab performance)	35% - Design assignment with formal documentation (modulated by lab performance)	
ELEC6237	Secure Hardware Design	50% - Analogue IC Design	50% - Digital IC design			
ELEC6245	Wireless Networks	20% - Tutorial presentation	80% - group coursework			
MATH6141	Numerical Methods	40% - 3 coursework assignments				60% - Exam, 2.25 hours
OPTO6007	An Introduction to Silicon Photonics	25% - 2 work sheets				75% - Exam, 2 hours
OPTO6008	Optical Fibre Technology I	20% - Assignments and problem sheets				80% - Exam. 2.5 hours
OPTO6009	Optical Fibre Technology I I	20% - Assignments and problem sheets				80% - Exam. 2.5 hours
COMP6206	Advanced Computer Vision	60% - Lecture material	40% - Group coursework			
COMP6208	Advanced Machine Learning	33.3% - Research Report				66.7% - Exam, 2 hours
COMP6210	Automated Software Verification	10% - Exercise in explicit state model checking	5% - Model checking exercise using CBMC	15% - Group exercise in using an OO software verification tool		70% - Exam, 2 hours
COMP6212	Computational Finance	100% - four computer labs				
COMP6228	Individual Research Project	75% - Literature search, interim and final report	25% - Poster			
ELEC6206	Nanofabrication and Microscopy	30% - Report about lithography simulation lab				70% - Exam, 2 hours
ELEC6207	Quantum Devices and Technology	50% - Advance logic device and lab report				50% - Exam, 2 hours
ELEC6208	MEMS Sensors and Actuators	40% - Accelerometer lab	30% - Resonator lab report	30% - Glucose sensor lab report		

Code	Module					
		report				
ELEC6209	Practical Applications of MEMS	10% - Two lab sessions	30% - Assignment 1: research, design, report	30% - Assignment 2: simulate, construct, report	30% - Assignment 3: characterisation/test report and analysis	
ELEC6210	Biosensors	50% - Report on laboratory work, data analysis and literature context				50% - Exam, 2 hours
ELEC6212	Biologically-Inspired Robotics	5% - Initial plans	40% - Technical execution	30% - Documentation	20% - Wiki or video	5% - Individual reflection
ELEC6213	Image Processing					100% - Exam, 2 hours
ELEC6214	Advanced Wireless Communication Networks and Systems					100% - Exam, 2 hours
ELEC6216	Personal Multimedia Communications	100% - progress report, individual presentation, final report				
ELEC6227	Medical Electrical and Electronic Technologies	33% - Report on Health Hazards of one electrical/electronic technology	33% - Report on one existing medical imaging technology and approaches being considered for improvement/development	33% - Report on new emerging medical technologies		
ELEC6228	Applied Control Systems	30% - Coursework sheet associated with each of the 3 control topics	50% - Group report of the experimental component	10% - Seminar presentation session given by each group	10% - Written critique of another group's work	
ELEC6231	VLSI Design Project	20% - Milestone Submissions	75% - Design Submission	5% - Individual Reflection		
ELEC6232	Analogue and Mixed Signal CMOS design	25% - Design Assignment				75% - Exam, 2 hours
ELEC6233	Digital System Synthesis	10% - Low Power Lab	40% - Complex system synthesis			50% - Exam, 2 hours
ELEC6234	Embedded Processors	50% - picoMIPS synthesis				50% - Exam, 2 hour(s)
ELEC6235	System on Chip Design Project	100% - Main Report				
ELEC6242	Cryptography	20% - Cryptanalysis Investigation				80% - Exam, 2 hours
ELEC6252	Future Wireless Techniques	15% - Matlab based	15% - Matlab based			70% - Exam, 2.5 hours
MATH6149	Modelling with Differential Equations	75% - 3 group projects	25% - coursework			
OPTO6003	Photonic Materials	30% - 6 x 2 pages				70% - Exam, 2 hours
OPTO6004	Metamaterials, Nanophonics and Plasmonics	20% - Problem sheets				80% - Exam, 3 hours
OPTO6010	Advanced Fibre Telecommunication Technologies	30% - Assignments and problem sheets				70% - Exam, 2 hours
OPTO6011	Optical Fibre Sensor Technologies	20% - Assignments and problem sheets				80% - Exam, 2.5 hours

Note that, for clarity, this overview of the programme structure does not detail the differences between the specialist themed degrees; for these, see the detailed programme structure above.

Part I

Core: ELEC1206 MATH1055 ELEC1200 ELEC1201 ELEC1202 ELEC1204 ELEC1205 ELEC1207

PASS

→ CertHE

Part II

Compulsory: ELEC2212 ELEC2220 ELEC2221 MATH2047 ELEC2201 ELEC2204 ELEC2205 ELEC2216

PASS

→ DipHE

Part III (MEng)

Core: COMP3200 **Compulsory:** COMP3219

Optional: COMP3201 COMP3206 COMP3215 ELEC3201 ELEC3203 ELEC3205 ELEC3207 ELEC3210 ELEC3218 ELEC3221 ELEC3222 ELEC3223 MATH3081 MATH3083 COMP3212 COMP3214 COMP3216 COMP3217 ELEC3202 ELEC3204 ELEC3206 ELEC3208 ELEC3217 ELEC3219 MATH3082 MATH3084

PASS

Part III (BEng)

Core: COMP3200

Optional: COMP3201 COMP3206 COMP3215 ELEC3201 ELEC3203 ELEC3205 ELEC3207 ELEC3210 ELEC3218 ELEC3221 ELEC3222 ELEC3223 COMP3219 MATH3081 MATH3083 COMP3212 COMP3214 COMP3216 COMP3217 ELEC3202 ELEC3204 ELEC3206 ELEC3208 ELEC3217 ELEC3219 MATH3082 MATH3084

PASS

BEng

Year in Industry

Core: ELEC3200

PASS

Part IV

Core: ELEC6200

Optional: COMP6202 COMP6204 ELEC6201 ELEC6202 ELEC6203 ELEC6204 ELEC6205 ELEC6217 ELEC6230 ELEC6237 ELEC6245 MATH6141 OPTO6007 OPTO6008 OPTO6009 COMP6206 COMP6208 COMP6210 COMP6212 COMP6228 ELEC6206 ELEC6207 ELEC6208 ELEC6209 ELEC6210 ELEC6212 ELEC6213 ELEC6214 ELEC6216 ELEC6227 ELEC6228 ELEC6231 ELEC6232 ELEC6233 ELEC6234 ELEC6235 ELEC6242 ELEC6252 MATH6149 OPTO6003 OPTO6004 OPTO6010 OPTO6011

PASS

Part IV

Core: ELEC6200

Optional: COMP6202 COMP6204 ELEC6201 ELEC6202 ELEC6203 ELEC6204 ELEC6205 ELEC6217 ELEC6230 ELEC6237 ELEC6245 MATH6141 OPTO6007 OPTO6008 OPTO6009 COMP6206 COMP6208 COMP6210 COMP6212 COMP6228 ELEC6206 ELEC6207 ELEC6208 ELEC6209 ELEC6210 ELEC6212 ELEC6213 ELEC6214 ELEC6216 ELEC6227 ELEC6228 ELEC6231 ELEC6232 ELEC6233 ELEC6234 ELEC6235 ELEC6242 ELEC6252 MATH6149 OPTO6003 OPTO6004 OPTO6010 OPTO6011

PASS

MEng w/ Industrial Studies

MEng

Appendix 2:

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
T**extbooks**		Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source. Some modules suggest reading texts as **optional** background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.
Equipment and Materials Equipment	Art Equipment and Materials: Drawing paper; painting materials; sketchbooks	
	Art Equipment and Materials: Fabric, Thread, Wool	
	Design equipment and materials:	
	Excavation equipment and	

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
	materials:	
	Field Equipment and Materials:	
	Laboratory Equipment and Materials:	
	Medical Equipment and Materials: Fobwatch; stethoscopes;	
	Music Equipment and Materials	
	Photography:	
	Recording Equipment:	
IT	Computer Discs	
	Software Licenses	
	Hardware	
Clothing	Lab Coats	
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	
	Fieldcourse clothing:	
	Wet Suits?	
	Uniforms?	
Printing and Photocopying Costs		In the majority of cases, coursework such as essays; projects; dissertations is likely to be submitted on line. However, there are some items where it is not possible to submit on line and students will be asked to provide a printed copy.
Fieldwork: logistical costs	Accommodation:	
	Insurance	
	Travel costs	
	Immunisation/vaccination costs	
	Other:	
Placements (including Study Abroad Programmes)	Accommodation	
	Insurance	
	Medical Insurance	
	Travel costs	
	Immunisation/vaccination costs	
	Disclosure and Barring Certificates or Clearance	
	Translation of birth certificates	
	Other	
Conference expenses	Accommodation	
	Travel	
Optional Visits (e.g. museums, galleries)		
Professional Exams		
Parking Costs		
Anything else not covered elsewhere		

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS

Revision History

1. Bashir Al-Hashimi, and other course leaders, May 2002, version 4.
2. MEng Euro and Tripartite – Mark Zwolinski, December 2002.
3. Denis A Nicole: Pt III and IV options clarified, June 2003.
4. Denis A Nicole: New course codes added, September 2003.
5. Denis A Nicole: Minor revisions of Pts III and IV, April 2004.
6. Denis A Nicole: Course code revisions, August 2004.
7. Denis A Nicole, Ordinary degree and options revisions, Dec 2004.
8. Denis A. Nicole, Option updates, April 2005, October 2005.
9. Denis A Nicole, Change of name to Digital Systems Engineering, removal of Euro and Electronics courses, March 2006,
10. Denis A Nicole, Pt III option updates, May 2006.
11. Steve R Gunn, Pt IV option updates, May 2006.
12. Steve R Gunn, MEng Electronic Engineering with Power Systems added, May 2006.
13. Steve R Gunn, Change of name to Electronic Engineering with Wireless Communications, Sept 2006.
14. Steve R Gunn, Pt III option updates, April 2007.
15. Denis A. Nicole, removed DSE, 120 credit Pt IV, March 2008.
16. Denis A Nicole, agreed updates, May 2008.
17. Denis A Nicole, added …with Mobile and Secure Systems, Sept 2008.
18. Steve R Gunn, Pt III & IV option updates, February 2008.
19. Denis A Nicole, FESM reading group updates, February 2009.
20. Denis A Nicole, Updates for new Pt I, May 2012.
21. Approved at Faculty Programme Committee 02 May 2012.
22. Bug fixes 03 May 2012, 06 Aug 2012
23. Mark Zwolinski, 6 Mar 2013, Industrial Studies
    Denis A Nicole, 21 Sep 2012 (compulsory/core modules typos).
24. Denis A Nicole, 1 May 2013, Updates for new Pt II
25. Denis A Nicole, 11 Jan 2014, Updates for new Pt III/IV
26. Denis A Nicole, 11 Jan 2014, Updates to new Pt III/IV, semester change in Pt II, replacement of "with XX" by (XX).
27. Rob Maunder, March/April 2014, Updates to new Pt III/IV, adopted new programme specification template.
28. Rob Maunder, 25 Apr 2014. Replaced CATS credits with ECTS credits. Changed NQF to FHEQ. Clarified parts in "with industrial studies". Updated MATHxxxx modules. Allowed broadening in either semester.
29. Rob Maunder, 29 Apr 2014. Some slight updates to MATHxxxx and OPTOxxxx modules.
30. Rob Maunder, 17 June 2014. Correction to assessment of ELEC1201.
31. Rob Maunder, 19 June 2014. Rename MEng Electronic Engineering with Optical Communications to MEng Electronic Engineering with Photonics.
32. Rob Maunder, 25 June 2014. Elaboration to A level entry requirements.
33. Rob Maunder, 21 July 2014, Slight changes to the exam weighting in ELEC1207 and ELEC6242.
34. Rob Maunder, 24 July 2014, Clarified assessment in ELEC2212 from coursework to lab.
35. Rob Maunder, 25 Sept 2014, Changed duration of ELEC3221 exam to 2.5 hours.
36. Rob Maunder, 4 Nov 2014, Added MATH6149
37. Rob Maunder, 14 Nov 2014, Included transfer policy
38. Rob Maunder, 27 Nov 2014, Added ELEC3222
39. Rob Maunder, 15 Dec 2014, Updated ELEC6230 assessments and apopted some best practice from CS/SE
40. Rob Maunder, 26 Jan 2015, Updated assessment weightings for ELEC2201, ELEC2216, ELEC3206 and ELEC6227.
41. Rob Maunder, 28 Jan 2015, Added optional modules ELEC6234, OPTO6008, OPTO6009, OPTO6010, OPTO6011
42. Rob Maunder, 3 Mar 2015, Updated the assessment for OPTO6004
43. Rob Maunder, 31 Mar 2015, Included ELEC3210 as an additional option and removed OPTO6010 and OPTO6011 for options in programmes besides 'with Photonics'
44. Rob Maunder, 2 Apr 2015, Changes to the assessment of ELEC2212
45. Rob Maunder, 30 Apr 2015, Changes to the assessment of ELEC2220
46. Rob Maunder, 7 May 2015, Changed ELEC2221 from 75/15/10 exam/design/labs, to 70/15/15.
47. Martyn Stringer, 10 June 2015, Update to Support and Student Learning, IT Services
48. Martyn Stringer, 10 June 2015, Update to Language Requirements
49. Approved by ECS Education Committee - 10 June 2015
50. Update to Programme Overview (CMA Changes) – 24 August 2015
51. Rob Maunder, 4 Sept 2015, adjusted assessment weightings for ELEC6242
52. Rob Maunder , 8th Sept 2015, adjusted assessment weightings for ELEC6212
53. Rob Maunder, 15th Sept 2015, adjusted assessment weightings for ELEC1206

54. Rob Maunder, 25th Sept 2015, adjusted assessment weightings for ELEC2204 and ELEC2216
55. Rob Maunder, 29th Oct 2015, included procedure for overseas study in part 4
56. Rob Maunder, 25th Jan 2016, removed MATH6148
57. Rob Maunder, 1st Feb 2016, Group Design Project (Overseas Placement)
58. Rob Maunder, 2nd Feb 2016, Fixed typo in assessment of ELEC1206
59. Rob Maunder, 10th Feb 2016, Included Introduction to Bionanotechnology
60. Rob Maunder, 8th Aug 2016, Changed assessment weighting for ELEC3222
61. CQA team, 7th Dec 2016, included optional module viability.
62. Rob Maunder, 7th March 2017, Changes to ELEC6241, MANG3067, ELEC2216, ELEC6208, ELEC6203.
63. Rob Maunder, 15th March 2017, Added ELEC6252.
64. CQA Team, 30th March 2017, FPC approval for 2017/18
65. CQA Team, 17th May 2017, removal of suspended module ELEC6215
66. CQA Team, 17th May 2017, changed name of ELEC6237 System on Chip to 'Secure Hardware Design'
67. Rob Maunder, 17th May 2017, reverted the names of ELEC6203 and ELEC6208
68. CQA Team, 26th June 2017, removed suspended COMP3216.
69. Rob Maunder, 22nd Sept 2017, fixed the title of ELEC1205
70. CQA Team, 7th December 2017, FPC approved optional module size caveat