

## Programme Specification

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### MEng Biomedical Electronic Engineering (2019-20)

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	4
Accreditation details	
Final award	Master of Engineering (MEng)
Name of award	Biomedical Electronic Engineering
Interim Exit awards	Bachelor of Engineering with Honours (BEng (Hons)) Bachelor of Engineering (BEng) Certificate of Higher Education (CertHE) Diploma of Higher Education (DipHE)
FHEQ level of final award	Level 7
UCAS code	B90B
Programme code	7015
QAA Subject Benchmark or other external reference	Engineering (MEng) 2010
Programme Lead	Daniel Spencer (dcs1r12)

## Programme Overview

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### Brief outline of the programme

This programme will provide you with a detailed knowledge of electronics and biomedicine, together with the ability to apply engineering principles to medicine and healthcare. The course has a strong emphasis on new technologies in bio-sensing, bio-signal analysis, bio-control and rehabilitation, and lab-on-a-chip diagnostic systems. In the first two years you will take core and compulsory modules in electronics together with a thorough grounding in mathematics, complemented by modules covering the fundamentals in Life Science. In year two, you will apply your knowledge to design a health and wellness monitoring platform within a healthcare technologies design project. In the third and fourth years, a mixture of optional and compulsory modules together with projects allows you to specialise within biomedical electronic engineering. In the fourth and final year of the MEng course, you will develop skills during a health care focused Group Design Project which is compulsory and taken over the

full academic year.

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. This approach ensures that at the end of your studies 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 and focus in depth on what really interests you.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles.

### **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 your 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 coursework

## **Special Features of the programme**

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### **Transfer policy**

Biomedical Electronic Engineering (BEE) has a significantly different course structure than the other electronics programmes (Electronic Engineering (EL), Electrical & Electronic Engineering (EEE), Electrical Engineering (EE), Mechatronic Engineering (EM) and Aerospace Electronic Engineering (AEE). This imposes complications upon transfers between these programmes.

Students who are thinking about transferring between BEE, AEE, 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 from BEng BEE to BEng EL, EEE or EE 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 from MEng BEE to MEng EL, EEE, or EE at the end of part 1, for students that have met the same criterion. These students are advised to study the communications topics of ELEC1207, as well as the topics of either ELEC1203 (EE or EEE) or ELEC1204 (EL or EEE) as appropriate, during the summer before beginning part 2.

Similarly, students who are thinking about transferring from BEng to MEng programmes are encouraged to discuss this with their academic tutors at the earliest possible opportunity. Transfers from BEng to 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 from BEng to 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).

**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](#).

## Educational Aims of the Programme

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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 a coherent and well balanced coverage of the theory, design and practical aspects of the subject 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 biomedical 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 life 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.

## Programme Learning Outcomes

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### Knowledge and Understanding

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On successful completion of this programme you will have knowledge and understanding of:

- A1. Underpinning key mathematics and science skills appropriate to biomedical electronic 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 biomedical electronic 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, social and ethical factors of significance to biomedical engineering, including the broader obligations of engineers to society.
- A7. How established techniques of research and enquiry are used to create and interpret knowledge in biomedical electronic engineering.
- A8. How to make critical evaluations of current research and advanced scholarship in biomedical electronics, to evaluate methodologies and to develop critiques of them.

### **Teaching and Learning Methods**

This programme is 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. A satisfactory knowledge and understanding of outcome A1 is required to complete the modules in parts I and II. Outcomes A2, A5-A8 are reached 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.

### **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).

### **Subject Specific Intellectual and Research Skills**

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On successful completion of this programme you will be able to:

- B1. Integrate knowledge of mathematics, physical and life sciences, information technology, business 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 biomedical 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 skills laboratories 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**

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On successful completion of 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 programme,
- C4. Understand the need for continuing professional development in recognition of lifelong learning,

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

### **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**

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On successful completion of this programme you will be able to:

- D1. Specify, design, and create 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 biomedical 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.
- D6. Plan and safely execute practical and laboratory-based biomedical experiments.

### **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. Skill D6 is taught in laboratory sessions and project work in every part of the degree.

### **Assessment Methods**

Design Exercises (skills D1,D2, D5 and D6), Supervised Laboratories (skills D3,D4 and D6), Design

Projects (skills D4-D6), Technical Reports and Seminar Presentations (skill D5).

## Programme Structure

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The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

### Part I

#### Typical course content

You will study 60 European Credit Transfer and Accumulation System (ECTS) credit points, in parts 1, 2 and 3. MEng students study 60 ECTS 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 ECTS credit points at level 6. This will qualify you for the award of the enhanced degree.

The first two years of the programme is based on core and compulsory modules covering the fundamentals common to all electronics degrees, complemented with the fundamentals of the life sciences. This includes design exercises and laboratories that are specific to life sciences and biomedical engineering. In the third and fourth years, compulsory modules and projects further develop your skills in biomedical electronics with optional modules for further specialisation.

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; 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. Each part comprises two semesters, each containing twelve teaching weeks, followed by two or three examination weeks.

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

All modules are core. A core module is a module which must be taken and passed by all students. Core modules may not be passed by compensation, but they are eligible for referral and repeat. Referral is the re-taking of all or part of the assessment or an alternative assessment for a failed module in order to achieve the pass mark. Repeat is the re-taking of assessments during the academic year following the first attempt, or following an unsuccessful referral.

## Part I Core

Code	Module Title	ECTS	Type
ELEC1202	Digital Systems and Microprocessors	7.5	Core
ELEC1206	Electrical Materials and Fields	7.5	Core
ELEC1200	Electronic Circuits	7.5	Core
ELEC1209	Electronic Systems for Biomedicine	7.5	Core
MATH1055	Mathematics for Electronic and Electrical Engineering	7.5	Core
ELEC1210	Molecular Basis of Life	7.5	Core
ELEC1201	Programming	7.5	Core
ELEC1205	Solid State Devices	7.5	Core

## Part II

Part II: 60 ECTS credit points, all at FHEQ level 5 except for BIOL1011 (Level 4)

All modules are compulsory. A compulsory module is a module which must be taken by all students. Compulsory modules may be passed by compensation or by referral. Pass by compensation is the award of credit for a failed module on the basis that performance elsewhere in the part is sufficient to ensure the learning outcomes of the programme tested in that part have been met, or will be met following successful referral.

## Part II Compulsory

Code	Module Title	ECTS	Type
ELEC2216	Advanced Electronic Systems	7.5	Compulsory
ELEC2226	Biomedical Control	7.5	Compulsory
ELEC2204	Computer Engineering	7.5	Compulsory
ELEC2221	Digital Systems and Signal Processing	7.5	Compulsory

ELEC2225	Health Technologies Design Project	7.5	Compulsory
MATH2047	Mathematics for Electronics & Electrical Engineering Part II	7.5	Compulsory
ELEC2227	Semiconductor Devices and Sensors	7.5	Compulsory
BIOL1011	Systems Physiology	7.5	Compulsory

### Part III

Part III: 60 ECTS credit points, all at FHEQ level 6 (except for BIOL2014 and some language and broadening modules)

All students must take the COMP3200 Individual Project (22.5 ECTS credits), which is core and is weighted 7.5 ECTS credits in Semester I and 15 ECTS 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 ECTS credits. Besides COMP3200, COMP3212 and COMP3219, a maximum of 2 other “externally taught” modules (BIOLXXXX, USOMxxxx, COMPxxxx, SESGxxxx, SESMxxxx, ENTRxxxx, FRENxxxx, GERMxxxx, LANGxxxx, LAWSxxxx MANGxxxx and MATHxxxx ) may be chosen. Students must select a 30:30 credit balance between semesters.

Additional optional modules that can be taken include:

- BIOLxxxx modules: Modules from the Centre of Biological Sciences may be taken subject to approval by the module leaders and fulfilment of the prerequisites.

- LANGxxxx modules: A language module scheduled in the Broadening Horizons slot. The appropriate stage will be selected after diagnostic testing by the language school.

- UOSMxxxx modules: Any other module from the University’s Broadening Horizons programme. Particularly relevant modules include:

UOSM2004 Global Health

UOSM2013 Pathological Mechanisms of Disease UOSM 2027 Health Policy and Economics

UOSM 2031 Engineering Replacement Body Parts

This programme has core, compulsory and optional modules as follows:

### Part III Compulsory

Code	Module Title	ECTS	Type
ELEC3226	Biosensors and Diagnostics	7.5	Compulsory
COMP3219	Engineering Management and Law	7.5	Compulsory
BIOL2014	Neuroscience	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Code	Module Title	ECTS	Type
MATH3083	Advanced Partial Differential Equations	7.5	Optional
ELEC3208	Analogue and Mixed Signal Electronics	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
ELEC3205	Control System Design	7.5	Optional
ELEC3206	Digital Control System Design	7.5	Optional
ELEC3221	Digital IC and Systems Design	7.5	Optional
UOSM2031	Engineering Replacement Body Parts	7.5	Optional
UOSM2004	Global Health	7.5	Optional
MATH3084	Integral Transform Methods	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional
MATH3081	Operational Research	7.5	Optional
MATH3082	Optimisation	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
ELEC3218	Signal and Image Processing	7.5	Optional

## Part IV

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

All students must take the ELEC6200 Group Design Project (22.5 ECTS credits), which is core and is weighted 15 ECTS 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 ECTS credits. Besides COMP6228, a maximum of 2 other “externally taught” modules (BIOLxxxx and MATHxxxx ) may be chosen. Students must select a 30:30 ECTS credit balance between semesters.

\*Modules from the Centre of Biological Sciences (BIOLxxxx) may be taken subject to approval by the module leaders and fulfilment of the pre-requisites.

Alternatively, semester II of Part 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. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

This programme has core, compulsory and optional modules as follows:

### Part IV Compulsory

Code	Module Title	ECTS	Type
ELEC6251	Medical Sensors and Instrumentation	7.5	Compulsory
ELEC6204	Microfluidics and Lab-on-a-Chip	7.5	Compulsory

### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

### Part IV Optional

Code	Module Title	ECTS	Type
ELEC6228	Applied Control Systems	7.5	Optional
ELEC6208	Bio/Micro/Nano Systems	7.5	Optional

ELEC6212	Biologically Inspired Robotics	7.5	Optional
ELEC6233	Digital Systems Synthesis	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
ELEC6201	Microfabrication	7.5	Optional
ELEC6203	Microsensor Technologies	7.5	Optional
MATH6149	Modelling with Differential Equations	7.5	Optional
ELEC6206	Nanofabrication and Microscopy	7.5	Optional
MATH6141	Numerical Methods	7.5	Optional
ELEC6237	Secure Hardware and Embedded Devices	7.5	Optional
ELEC6235	SOC Design Project	7.5	Optional
ELEC6231	VLSI Design Project	7.5	Optional
ELEC6230	VLSI Systems Design	7.5	Optional

## Progression Requirements

The programme follows the University's regulations for [Progression, Determination and Classification of Results : Undergraduate and Integrated Masters Programmes](#) and [Progression, Determination and Classification of Results: Postgraduate Master's Programmes](#) as set out in the University Calendar: <http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>

## 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.

- 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.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support and counselling. Support includes daily Drop In at Highfield campus at 13.00 – 15.00 (Monday, Wednesday and Friday out of term-time) or via on-line chat on weekdays from 14.00 – 16.00. Arrangements can also be made for meetings via Skype.
- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia).
- 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 and Employability services, 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
- Other support that includes health services (GPs), chaplaincy (for all faiths) and 'out of hours' support for students in Halls and in the local community, (18.00-08.00)
- 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 Student Handbook.

## Methods for evaluating the quality of teaching and learning

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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 by the Institution of Engineering and Technology
- The REF (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.

Further details on the University's quality assurance processes are given in the [Quality Handbook](#).

## Career Opportunities

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Major employers worldwide are keen to employ our graduates – in system development, technology and communications in the IT sector, in electronics and biomedical electronics in the engineering 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](http://www.ecs.soton.ac.uk/careers)) and hold our own annual careers fair.

## External Examiner(s) for the programme

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Name: Dr Danny O'Hare - Imperial College London

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 Academic 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.

## Appendix 1:

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 also have to pay for:

### Additional Costs

Type	Details
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.
Textbooks	<p>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.</p> <p>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.</p>
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.
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.

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](http://www.calendar.soton.ac.uk).