**Programme Specification**

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| **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 he/she passes the programme. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the programme handbook. The accuracy of the information contained in this specification is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education. |

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| **MEng Computer Systems Engineering**  **BEng(Hons) Computer Systems Engineering**  **MEng Computer Systems Engineering with a Year in Industry BEng(Hons) Computer Systems Engineering with a Year in Industry** |

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| 1. **Awarding Institution/Body** | University of Kent |
| 1. **Teaching Institution** | University of Kent |
| 1. **School responsible for management of the programme** | Engineering and Digital Arts |
| 1. **Teaching Site** | Canterbury |
| 1. **Mode of Delivery** | Full-time |
| 1. **Programme accredited by** | Institution of Engineering and Technology (IET) |
| 1. **a) Final Award** | BEng (Hons), MEng |
| 7. **b) Alternative Exit Awards** | BEng (non hons) Computer Systems Engineering;  Diploma in Computer Systems Engineering;  Certificate in Computer Systems Engineering |
| 1. **Programme** | Computer Systems Engineering |
| 1. **UCAS Code (or other code)** | H618: BEng(Hons) Computer Systems Engineering  H615: BEng(Hons) Computer Systems Engineering with a Year in Industry  H613: MEng Computer Systems Engineering  H617: MEng Computer Systems Engineering with a Year in Industry |
| 1. **Credits/ECTS Value** | 360 credits (180 ECTS) (BEng)  480 credits (240 ECTS) (MEng) |
| 1. **Study Level** | Undergraduate |
| 1. **Relevant QAA subject benchmarking group(s)** | Engineering (2015) |
| 1. **Date of creation/revision** | July 2009/Revised April 2016/revised FSO Jan 2018 |
| 1. **Intended Start Date of Delivery of this Programme** | September 2019 |

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| 1. **Educational Aims of the Programme**   The programme aims to: |
| 1. Educate students to become computer systems engineers who are well equipped for professional careers in development, research and production in industry and universities, and who are well adapted to meet the challenges of a rapidly changing subject. 2. Produce computer systems engineers with specialist skills in hardware and software engineering, prepared for the complexities of modern computer system design. 3. Enable students to satisfy the educational requirements of the IET for C. Eng. registration. 4. Provide for all students, academic guidance and welfare support given by academic advisers and dedicated professional services staff. 5. Create an atmosphere of co-operation and partnership between staff and students, and offer the students a community environment where, with staff and peers, they can develop their potential in terms of computer systems engineering and a rich set of transferable skills.   The Year in Industry programme additionally aims to:   1. Give an opportunity to gain experience as an engineer working in a professional environment. 2. To develop employment-related skills, including an understanding of how you relate to the structure and function in an organisation, via a year in industry.   The MEng programme additionally aims to:   1. Produce high calibre professional engineers with advanced knowledge of modern embedded electronic systems. 2. Enable students to fully satisfy all of the educational requirements for Chartered Engineer (C. Eng) registration. |

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| **16 Programme Outcomes**  The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas.  The programme outcomes have references to the subject benchmarking statement for Engineering (2015) using the Engineering Council and IET AHEP3 learning outcomes for partial(p) and complete (m) fulfilment of the educational requirements for Chartered Engineer registration, for the BEng and MEng courses respectively. Partial fulfilment of educational requirements for CEng also corresponds to complete fulfilment of educational requirements for Incorporated Engineer (IEng). |

**A. Knowledge and Understanding of:**

1. Mathematical principles relevant to computer systems engineering, underpinning circuit analysis and design, signal processing, embedded and control systems, and communication networks. (SM2p).
2. Scientific principles and methodology relevant to computer systems engineering with an emphasis on practical applications in computer systems, embedded and control systems and communication networks. (SM1p).
3. Advanced concepts of embedded systems, signals and image processing, control, computer communications and operating systems, influenced by ongoing and current industrial needs and informed by internationally recognised relevant research expertise.
4. The value of intellectual property and contractual issues for professional and entrepreneurial engineers (EP5p, EP5m).
5. Business, management and project management techniques, seen mainly in a case study context which may be used to achieve engineering objectives (ET1p, ET2p, ET3p, ET5p, ET2m).
6. The need for a high level of professional and ethical conduct in computer systems engineering, directly applied in a case study context. (ET1p, ET1m).
7. Current manufacturing practice with particular emphasis on product safety, environmental and EMC standards and directives (ET6p, D2p).
8. Characteristics of the materials, equipment, processes and products required for electronics, network communications, instrumentation, sensing and digital systems (EP2p, EP2m).
9. Appropriate codes of practice, industry standards and quality issues, directly applied in a case study context. (EP6p, EP7p, ET6p, EP6m, EP7m).
10. Contexts in which engineering knowledge can be applied to solve new problems (EP1p).

*Outcomes specific to Year in Industry programme:*

1. Aspects of the core subject areas of computer systems, electronics and communication networks from the perspective of a commercial or industrial organisation.

*Outcomes specific to the MEng programme:*

1. A comprehensive understanding of computer systems, embedded electronic systems and communication networks and an awareness of developing technologies in this field (SM1m, SM4m).
2. A comprehensive knowledge and understanding of mathematical and computer models for a critical analysis of computer systems and embedded systems (SM2m, SM5m).
3. An extensive knowledge and understanding of business, management and professional practice concepts, their limitations, and how they may be applied (SM6m, ET1m, ET3m, ET7m, EP9m).
4. Wide knowledge and understanding of design processes relevant to computer systems and embedded systems (D4m, D7m).
5. Extensive knowledge of characteristics of materials, equipment, processes and products required for electronics, network communications, instrumentation, sensing and digital systems. (EP2m).
6. Contexts in which a wide range of engineering knowledge can be applied, to solve new problems (EP1m)

**Skills and Other Attributes**

**B. Intellectual Skills:**

1. Analysis and solution of hardware and software engineering problems using appropriate mathematical methods with a strong emphasis on engineering example based learning and assessment. (SM2p)
2. Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of computer systems engineering particularly through student led practical project design (SM3p).
3. Use of engineering principles and the ability to apply them to analyse key computer systems engineering processes with an emphasis on simulation and practical learning (EA1p).
4. Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques with an emphasis on simulation and practical learning (EA2p, EA2m).
5. Ability to apply and understand a systems approach to computer systems engineering problems by top level analysis to consolidate learning of underpinning principles. (EA4p).
6. Ability to investigate and define a problem and identify constraints including cost drivers, economic, environmental, health and safety and risk assessment issues largely by undertaking student lead individual and group project work. (ET6p, D2p, EP9p, D2m, EP11m).
7. Ability to use creativity to establish innovative, aesthetic solutions whilst understanding customer and user needs, ensuring fitness for purpose of all aspects of the problem including production, operation, maintenance and disposal (D1p, D2p, D4p, D5p, D1m, D2m, D6m).
8. Ability to demonstrate the economic and environmental context of the engineering solution (ET1p, ET3p, ET4p, ET4m).

*Outcomes specific to Year in Industry programme:*

1. Apply some of the intellectual skills specified for the programme from the perspective of a commercial or industrial organisation.

*Outcomes specific to the MEng programme:*

1. Ability to use fundamental knowledge to explore new and emerging technologies (EA5m).
2. Ability to understand the limitations of mathematical and computer based problem solving and assess the impact in particular cases (SM5m).
3. Ability to extract data pertinent to an unfamiliar problem and apply it in the solution (EA6m).
4. Ability to evaluate commercial risks through some understanding of the basis of such risks (D2m, ET6m, ET7m).
5. Ability to apply engineering techniques taking account of commercial and industrial constraints (SM6m, D2m, EP10m).
6. Ability to critically apply and integrate knowledge and understanding of other engineering disciplines to support study of electronic engineering particularly. (SM3m).
7. Use of engineering principles and the ability to apply them to critically analyse key electronic engineering processes. (EA1m).
8. Ability to apply and understand a systems approach to complex electronic engineering problems by top level analysis. (EA4m).

**C. Subject-specific Skills:**

1. Use of mathematical techniques to analyse problems relevant to electronic, communications, instrumentation, control and embedded systems engineering. (SM2p)
2. Ability to work in an engineering laboratory environment and to use a wide range of electronic equipment, workshop equipment and CAD tools for the practical realisation of electronic circuits (Ep1p, EP3p, EP3m).
3. Ability to work with technical uncertainty or incomplete knowledge particularly through experiential learning in practical project design (EP8p, D3p, D3m, EP8m).
4. Ability to apply quantitative methods and computer software relevant to computer systems engineering in order to solve engineering problems in analytical, simulation based, and practical engineering activities (EA3p).
5. Ability to implement software solutions using a range of structural and object oriented languages.
6. Ability to design hardware or software systems to fulfil a product specification and devise tests to appraise performance. (D5p, EP9p)
7. Awareness of the nature of intellectual property and contractual issues and an understanding of appropriate codes of practice and industry standards (EP5p, D2p, EP7p, ET2p, ET5p).
8. Ability to use technical literature and other information sources and apply it to a design (EP4p, EP4m).
9. Ability to apply management techniques to the planning, resource allocation and execution of a design project and evaluate outcomes (D5p, D3m).
10. Ability to prepare technical reports and give effective and appropriate presentations to technical and non-technical audiences. (D6p, D6m).

*Outcomes specific to Year in Industry programme:*

1. Apply some of the subject-specific skills specified for the programme from the perspective of a commercial or industrial organisation.

*Outcomes specific to the MEng programme:*

1. An ability to apply business, management and professional issues to engineering projects (SM6m, ET3m, EP10m, EP11m).
2. Ability to apply knowledge of design processes in unfamiliar situations and to generate innovative designs to fulfil new needs particularly in computer systems and embedded systems (D4m, D6m).
3. Ability to apply quantitative and computational methods relevant to electronic engineering in order to solve problems using alternative approaches and understanding their limitations. (EA3m).
4. Awareness of the nature of international intellectual property and contractual issues and an understanding of appropriate codes of practice and industry standards. (EP5m, ET5m)

**D. Transferable Skills:**

1. Ability to generate, analyse, present and interpret data.
2. Use of Information and Communications Technology.
3. Personal and interpersonal skills, work as a member of a team.
4. Communicate effectively (in writing, verbally and through drawings).
5. Learn effectively for the purpose of continuing professional development.
6. Ability for critical thinking, reasoning and reflection.
7. Ability to manage time and resources within an individual project and a group project.

**Teaching/learning and assessment methods and strategies used to enable the programme learning outcomes to be achieved and demonstrated**

**Teaching/learning**

Lectures; tutorial lectures; demonstrator-led examples classes; tutor-led small group supervisions; project work throughout all three years’ gives students experience of a wide range of practical design, manufacturing and testing skills; laboratory experiments and computer-based assignments. The 2nd and 3rd year projects give hands-on experience of hardware and software design, and project management.

**Assessment**

Written unseen examinations; assessed coursework in the form of examples class assignments, laboratory write-ups, assessed project work, tests, computer-based assignments; presentations and essays.

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| For more information on the skills developed by individual modules and on the specific learning outcomes associated with any Certificate, Diploma or BA/BSc non-honours awards relating to this programme of study, see the module mapping table, located at the end of this specification. |

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| **17 Programme Structures and Requirements, Levels, Modules, Credits and Awards**  The BEng programme is studied over three years full-time with an additional industrial placement year for the Year in Industry variant. The MEng programme is studied over four years full-time with an additional placement year for the Year in Industry variant.  The BEng programme is divided into three stages for the 3 year programme and four stages for the Year in Industry variant. The MEng programme is divided into four stages for the 4 year programme, and five stages for the Year in Industry variant. Each stage comprising modules to a total of 120 credits. Students must successfully complete each module in order to be awarded the specified number of credits for that module. One credit corresponds to approximately ten hours of 'learning time' (including all classes and all private study and research). Thus obtaining 120 credits in an academic year requires 1,200 hours of overall learning time. For further information on modules and credits refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html>  Each module and programme is designed to be at a specific level. For the descriptors of each of these levels, refer to Annex 2 of the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfoannex2.html>.  To be eligible for the award of an honours degree students on the three year programme must normally have to obtain 360 credits, at least 210 of which must be Level 5 or above, and at least 90 of which must be level 6 or above at Stage 3. To be eligible for the award of an honours degree on the Year in Industry variant, students normally have to obtain 480 credits, at least 330 of which must be Level 5 or above, and at least 90 of which must be level 6 or above at Stage 3. A degree without honours will be awarded where students achieve 300 credits with at least 150 credits at level 5 or above including at least 60 credits at level 6 or above at Stage 3. Students may not progress to the non-honours degree programme; the non-honours degree programme will be awarded as an alternative exit award only. For the MEng, students must gain credit for all Stage 4 modules, in addition to the requirements specified for the corresponding BEng (3 year or Year in Industry) honours degree programmes.  For the purposes of Honours classification, the weightings of the stages are:  H618: Stage 2 30%, Stage 3 70%  H615: Stage 2 25%, Stage S (Industrial Placement) 10%, Stage 3 65%  H613: Stage 2 20%, Stage 3 30%, Stage 4 50%  H617: Stage 2 18%, Stage S (Industrial Placement) 5%, Stage 3 27%, Stage 4 50%  **Alternative Exit Awards:**  Students successfully completing Stage 1 of the programme and meeting credit framework requirements who do not successfully complete Stage 2 will be eligible for the award of the Certificate in Computer Systems Engineering.  Students successfully completing Stage 1 and Stage 2 of the programme and meeting Credit Framework requirements who do not successfully complete Stage 3 will be eligible for the award of the Diploma in Computer Systems Engineering.  Students successfully completing Stage 2 of the programme and achieving 300 credits overall including at least 60 credits at level 6 or above in Stage 3 and meeting Credit Framework requirements will be eligible for the award of a non-honours degree.  Students successfully completing Stage 2 and also the placement and meeting credit framework requirements will be eligible for the award of the Diploma with a Year in Industry  For further information refer to the Credit Framework at <https://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html#exit-awards>.    Compulsory modules are core to the programme and must be taken by all students studying the programme. Optional modules provide a choice of subject areas, from which students will select a stated number of modules. The normal expectation is that the termly module load will be equally balanced across the terms.  Where a student fails a module(s) due to illness or other mitigating circumstances, such failure may be condoned, subject to the requirements of the Credit Framework and provided that the student has achieved the **programme** learning outcomes. For further information refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html>.  Where a student fails a module(s), but has marks for such modules within 10 percentage points of the pass mark, the Board of Examiners may nevertheless award the credits for the module(s), subject to the requirements of the Credit Framework and provided that the student has achieved the **programme** learning outcomes. For further information refer to the Credit Framework.  Compensation of modules is limited to 15 credits per stage in line with IET accreditation requirements, except for Stage 1 where 30 credits can be compensated. Failure in certain modules, however, may not be compensated, as indicated by the symbol \* below. No modules at any stage of the programme can be trailed or condoned. The programme detailed below is subject to change.  Also in line with IET accreditation requirements, modules marked with a + require the coursework mark and the examination mark to be greater than or equal to 30% as well as achieving the module pass mark in order to obtain credit. In addition these modules will only be considered for compensation if the coursework mark and the examination mark are each greater than 30%.  Also in line with IET accreditation requirements, stage 4 modules marked with a *Δ* require the coursework mark and the examination mark to be greater than or equal to 40% as well as achieving the module pass mark in order to obtain credit. In addition these modules will only be considered for compensation if the coursework mark and the examination mark are each greater than 40%.  Students completing Stage 3 with a stage average greater or equal to 55% can remain on the MEng programme. Students on the MEng programme failing to meet this requirement can be awarded the BEng(Hons) degree if they have met the outcomes necessary for that programme. Students completing Stage 1 with an overall mark of 55% can transfer to/remain on the Year in Industry programme. |

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| **KV Code** | **Code** | **Title** | **Level** | **Credits** | **Term(s)** |
| **Stage 1** | | | | | |
| **Compulsory Modules** | | | | | |
| COMP3200 | CO320 | Introduction to Object-Oriented Programming | 4 | 15 | 1 |
| EENG3030 | EL303 | Electronic Circuits | 4 | 15 | 2 |
| EENG3??0 | EL3?? | Introduction to Mechanical Engineering and Design | 4 | 15 | 1 |
| EENG3050 | EL305 | Introduction to Electronics | 4 | 15 | 1 |
| EENG3110 | EL311 | First Year Engineering Applications Project | 4 | 15 | 2 |
| EENG3150 | EL315 | Digital Technologies | 4 | 15 | 2 |
| EENG3180 | EL318 | Engineering Mathematics | 4 | 15 | 1 |
| EENG3190 | EL319 | Engineering Analysis | 4 | 15 | 2 |
| **Stage 2** | | | | | |
| **Compulsory Modules** | | | | | |
| COMP5200 | CO520 | Further Object-Oriented Programming | 5 | 15 | 2 |
| EENG5600 | EL560+ | Microcomputer Engineering | 5 | 15 | 1+2 |
| EENG5610 | EL561+ | Image Analysis and Applications | 5 | 15 | 2 |
| EENG5620 | EL562 | Computer Interfacing Group Project | 5 | 15 | 1+2 |
| EENG5650 | EL565+ | Electronic Instrumentation and Measurement Systems | 5 | 15 | 1 |
| EENG5680 | EL568+ | Digital Implementation | 5 | 15 | 1+2 |
| EENG5690 | EL569+ | Signals and Systems | 5 | 15 | 1+2 |
| EENG5700 | EL570+ | Communications Principles | 5 | 15 | 2 |
| **Stage S - Industrial Placement Year** | | | | | |
| **Compulsory Modules** | | | | | |
| EENG7910\* | EL791 | Year in Industry (Industrial Assessment) | 5 | 90 | 1+2 |
| EENG7920\* | EL792 | Year in Industry (Academic Assessment) | 5 | 30 | 1+2 |
| **Stage 3** | | | | | |
| **Compulsory Modules** | | | | | |
| EENG6000 | EL600\* | Project | 6 | 45 | 1+2 |
| EENG6670 | EL667+ | Embedded Computer Systems | 6 | 15 | 1+2 |
| EENG6710 | EL671 | Product Development | 6 | 15 | 1+2 |
| EENG6730 | EL673+ | Digital Systems Design | 6 | 15 | 1+2 |
| EENG6760 | EL676+ | Digital Signal Processing and Control | 6 | 15 | 1+2 |
| **Optional Modules**  Students must select *one module* from the following: | | | | | |
| COMP6330 | CO633 | Computer Networks and Communications | 6 | 15 | 1 |
| COMP6340 | CO634 | Computer Security & Cryptography | 6 | 15 | 1 |
| COMP6430 | CO643 | Computing Law and Professional Responsibility | 6 | 15 | 2 |
| **Stage 4** | | | | | |
| **Compulsory Modules** | | | | | |
| BUSN9340 | CB934 | Strategy | 7 | 15 | 2 |
| EENG7500 | EL750 | Systems Group Project | 7 | 60 | 1+2 |
| EENG8290 | EL829*Δ* | Embedded Real-Time Operating Systems | 7 | 15 | 2 |
| **Optional Modules**  Students must select *two modules* from the following (of these only one of EL893 and EL896 may be taken): | | | | | |
| EENG8220 | EL822 | Data Networks and the Internet | 7 | 15 | 1 |
| EENG8570 | EL857*Δ* | Biometric Technologies | 7 | 15 | 1 |
| EENG8710 | EL871*Δ* | Digital Signal Processing | 7 | 15 | 1 |
| EENG8930 | EL893*Δ* | Reconfigurable Architectures | 7 | 15 | 1 |
| EENG8960 | EL896*Δ* | Computer and Microcontroller Architectures | 7 | 15 | 1 |

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| **18 Work-Based Learning** |
| Disability Statement: Where disabled students are due to undertake a work placement as part of this programme of study, a representative of the University will meet with the work placement provider in advance to ensure the provision of anticipatory and reasonable adjustments in line with legal requirements. |
| Students on the Year in Industry programme take two modules in their third year, and spend a year (minimum 30 weeks) working in an industrial or commercial setting, applying and enhancing the skills and techniques they have developed and studied in Stages 1 and 2 of their programme. The work they do is entirely under the direction of their industrial supervisor, but support is provided via an Employability Officer and Placement Tutor within the School. This support includes ensuring that the work they are being expected to do is such that they can meet the learning outcomes of the module.  The onus is on the student to secure the placement, however support and guidance is provided by the EDA Employability Officer  The Employability Officer makes the first visit to students who are on placement with companies where we have a long-standing industrial placement relationship. This takes place near the start of the placement to check that integration into the workplace is proceeding and that the work being required of the student is appropriate. The Placement Tutor makes the first visit to companies that we do not have an established collaboration with. The second placement visit is undertaken by the Placement Tutor towards the end of the placement to assess both the student’s performance and the organisation in order to ensure that both satisfy the requirements of the assessment process.  For further information, please refer to the year in industry module specifications. |

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| **19 Support for Students and their Learning** |
| * School and University induction programme * Programme/module handbooks * Library services <http://www.kent.ac.uk/library/> * Student Support <http://www.kent.ac.uk/studentsupport/> * Student Wellbeing [www.kent.ac.uk/studentwellbeing/](http://www.kent.ac.uk/studentwellbeing/) * Centre for English and World Languages <http://www.kent.ac.uk/cewl/index.html> * Student Learning Advisory Service <http://www.kent.ac.uk/uelt/about/slas.html> * PASS system <https://www.kent.ac.uk/teaching/qa/codes/taught/annexg.html> * Academic Adviser system <https://www.kent.ac.uk/teaching/advisers/index.html> * Kent Union [www.kentunion.co.uk/](http://www.kentunion.co.uk/) * Careers and Employability Services [www.kent.ac.uk/ces/](http://www.kent.ac.uk/ces/) * Counselling Service <https://www.kent.ac.uk/studentwellbeing/counselling/> * Information Services (computing and library services) [www.kent.ac.uk/is/](http://www.kent.ac.uk/is/) * Undergraduate student representation at School, Faculty and Institutional levels * International Recruitment Office <https://www.kent.ac.uk/internationalstudent/>; International Partnerships Office <https://www.kent.ac.uk/global/partnerships/> * Medical Centre <https://www.kent.ac.uk/studentwellbeing/medicalcentre.html>   School-specific support available:   * Moodle VLE pages with full module information, assignments, lecture notes, coursework submission etc. * SEDA web pages with comprehensive information regarding all aspects of studies at Kent. Also various newsgroups * Health and Safety booklet provided at the start of each academic year * Computing and multimedia facilities, lecture and seminar rooms and experimental laboratories all within the Jennison building and on the campus. Many of these rooms contain audio-visual equipment and computer projectors. * Welfare guidance: The School has a Student Support Officer providing guidance and support on welfare issues. * Support for Students on Placement   Support for the placement year commences early in Stage 2 with a briefing from the academic supervisor as to what students should expect during their placement year including the application process, the University support provided during the placement year and the range of work students are likely to undertake. Students are then supplied with details of placement opportunities as they become available. Students applying are given assistance and advice on the preparation of their CV, their application letters, and interview techniques.  Prospective employers attend a Student Placement briefing session so that they understand what to expect and what is required in terms of safety, induction and supervision. They also have the opportunity to meet the academic and administrative support staff who will be involved.  When students start their placement year they are given a Placement Year Handbook which includes:   * + Induction Checklist   + Contact details form   + Health and Safety Checklist (which must be signed by the employer)   + Final Report guidelines   + Year in Industry Performance Evaluation form (completed by student and employer) |

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| **20 Entry Profile**  The minimum age to study a degree programme at the university is normally at least 17 years old by 20 September in the year the programme begins. There is no upper age limit. |
| 20.1 **Entry Route**  For current information, please refer to the University prospectus |
| **BEng:**   * A level – BBB including B in Mathematics and a science/technology subject (Physics, Computing or Electronics) * BTEC Level 3 – Engineering: Distinction, Distinction, Merit including Further Mathematics for Technicians module * International Baccalaureate – 34 points overall or 15 at HL including Mathematics (not Mathematics Studies) and a science subject 5 at HL or 6 at SL   **MEng:**   * A level – ABB including B or above in Mathematics and a science/technology subject (Physics, Computing or Electronics) * BTEC Level 3 – Engineering: Distinction, Distinction, Merit including Further Mathematics for Technicians module * International Baccalaureate – 34 points overall or 16 at HL including Mathematics (not Mathematics Studies) and a science subject 5 at HL or 6 at SL |
| 20.2 **What does this programme have to offer?** |
| * An excellent grounding in the principles and technologies of digital systems design, embedded computer systems and digital communications * The opportunity to study subjects relevant to modern computer systems such as Computer Architecture, Object Oriented Design, Computer Networks and Software Engineering * The development of a broad range of skills that are highly sought after by employers and which open up a wide range of careers to graduates within the computer and electronics industries. * For the MEng, completion of all academic requirements for professional institution membership/Chartered Engineer status. |
| 20.3 **Personal Profile** |
| * An interest in the technology and applications of computer hardware and software. * A desire to become an engineer working in the computer industry. * Enthusiasm to apply computers to real world problems, willingness to work with computers and use computer aided design (CAD) tools. * A desire to develop programming skills in procedural and object oriented languages. |

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| 21 **Methods for Evaluating and Enhancing the Quality and Standards of Teaching and Learning** |
| 21.1 **Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards** |
| * Student module evaluations * Annual programme and module monitoring reports <http://www.kent.ac.uk/teaching/qa/codes/taught/annexe.html> * External Examiners system <http://www.kent.ac.uk/teaching/qa/codes/taught/annexk.html> * Periodic programme review <http://www.kent.ac.uk/teaching/qa/codes/taught/annexf.html> * Annual staff appraisal * Peer observation * Quality Assurance Framework <http://www.kent.ac.uk/teaching/qa/codes/index.html> * External accreditation by the Institution of Engineering and Technology (IET) |
| 21.2 **Committees with responsibility for monitoring and evaluating quality and standards** |
| * Staff-Student Liaison Committee * School Education Committee * Faculty Education Committee * Faculty Board * Education Board * Board of Examiners |
| 21.3 **Mechanisms for gaining student feedback on the quality of teaching and their learning experience** |
| * Student module evaluations * Staff-Student Liaison Committee * Student rep system (School, Faculty and Institutional level) * Annual NSS |
| 21.4 **Staff Development priorities include:** |
| * PGCHE requirements * HEA (associate) fellowship membership * Annual appraisals * Institutional Level Staff Development Programme * Academic Practice Provision (PGCHE, other development opportunities) * Professional body membership and requirements * Programme team meetings * Research seminars * Conferences * Study leave * Equality, Diversity and Inclusivity (EDI) awareness |

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| 22 **Indicators of Quality and Standards** |
| * Results of periodic programme review (2014) * Professional accreditation (Institution of Engineering and Technology (IET)) * QAA Higher Education Review 2015 * Annual External Examiner reports * Annual programme and module monitoring reports |
| 22.1 **The following reference points were used in creating these specifications:** |
| * QAA Benchmarking statement for Engineering (2015) * Accreditation requirements of Institution of Engineering and Technology (IET) * School and Faculty plan * University Plan <https://www.kent.ac.uk/about/plan/> and Learning and Teaching Strategies <https://www.kent.ac.uk/uelt/strategies/lta.html> * Staff research activities * Kent Inclusive Practices (<https://www.kent.ac.uk/studentsupport/accessibility/inclusive-practice.html>) |

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| 23 **Inclusive Programme Design** |
| The School recognises and has embedded the expectations of current equality legislation, by ensuring that the programme is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services. |

*Template last updated November 2017*

### **Curriculum Map for Computer Systems Engineering Awards**

Explanation. This map provides a design aid to help academic staff identify where the programme outcomes are being developed and assessed within the course. The map shows only the main measurable learning outcomes. There are many more outcomes in the module specifications. X=compulsory module LO, O=optional module LO.

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|  |  | Codes | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 | A12 | A13 | A14 | A15 | A16 | A17 |
| STAGE 1 | Introduction to Electronics | EL305 |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Engineering Mathematics | EL318 | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Engineering Analysis | EL319 | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Project | EL311 |  |  |  |  |  |  | x | x |  | x |  |  |  |  |  |  |  |
| Digital Technologies | EL315 |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Introduction to OO Programming | CO320 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Electronic Circuits | EL303 |  | x |  |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Intro to Mech Eng and Design | ELXXX |  | x |  |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| STAGE 2 | Digital Implementation | EL568 |  | x | x |  | x |  |  | x |  |  |  |  |  |  |  |  |  |
| Microcomputer Engineering | EL560 |  |  | x |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Computer Interfacing | EL562 |  |  |  |  | x | x |  | x | x | x |  |  |  |  |  |  |  |
| Signals and Systems | EL569 | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Electronic Instrumentation and Measurement Systems | EL565 |  | x | x |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Image Analysis & Applications | EL561 | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Communications Principles | EL570 | x | x | x |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Further OO Programming | CO520 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Year in Industry (IA) | EL791 |  |  |  |  |  |  |  | x |  |  | x |  |  |  |  |  |  |
|  | Year in Industry (AA) | EL792 |  |  |  |  |  |  |  | x |  |  | x |  |  |  |  |  |  |
| STAGE 3 | Project | EL600 |  |  |  | x | x | x | x | x | x | x |  |  |  |  |  |  |  |
| Embedded Computer Systems | EL667 |  |  | x |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Product Development | EL671 |  |  |  |  | x | x | x | x | x | x |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Digital Systems Design | EL673 |  |  | x |  |  |  |  | x | x | x |  |  |  |  |  |  |  |
| D.S.P. and Control | EL676 | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STAGE 4 | Systems Group Project | EL750 |  | x | x | x | x | x | x |  | x | x |  | x |  | x |  |  | x |
| DSP | EL871 | o | o | o |  |  |  |  | o |  |  |  | o | o |  |  | o | o |
| Data Networks and the Internet | EL822 | o | o | o |  |  |  |  | o |  |  |  | o | o |  |  | o | o |
| Biometric Technologies | EL857 | o | o | o |  |  |  |  |  |  |  |  | o | o |  |  | o | o |
| Microcontroller and Computer Architectures | EL896 | o | o | o |  |  |  |  |  |  |  |  | o |  |  | o | o | o |
| Reconfigurable Architectures | EL893 | o | o | o |  |  |  |  |  |  |  |  | o | o |  | o | o | o |
| Embedded Real-Time Operating Systems | EL829 | x | x | x |  |  |  |  |  |  |  |  | x | x |  | x | x | x |
| Business Strategy | CB934 |  |  |  |  | x |  |  |  |  |  | x |  |  | x |  |  |  |

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|  |  | Codes | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 | B12 | B13 | B14 | B15 | B16 | B17 |
| STAGE 1 | Introduction to Electronics | EL305 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Engineering Mathematics | EL318 | x |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Engineering Analysis | EL319 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Project | EL311 |  | x |  | x |  | x |  |  |  |  |  |  |  |  |  |  |  |
| Digital Technologies | EL315 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Introduction to OO Programming | CO320 |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Electronic Circuits | EL303 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Intro to Mech Eng and Design | ELxxx | x | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STAGE 2 | Digital Implementation | EL568 | x |  | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Microcomputer Engineering | EL560 |  |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Computer Interfacing | EL562 |  | x | x | x | x | x | x | x |  |  |  |  |  |  |  |  |  |
| Signal and Systems | EL569 | x |  | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Electronic Instrumentation and Measurement Systems | EL565 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Image Analysis & Applications | EL561 | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Communication Principles | EL570 | x |  | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Further OO Programming | CO520 |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Year in Industry (IA) | EL791 |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |
|  | Year in industry (AA) | EL792 |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |
| STAGE 3 | Project | EL600 |  | x | x | x | x | x | x | x |  |  |  |  |  |  |  |  |  |
| Embedded Computer Systems | EL667 |  | x | x |  | x |  | x |  |  |  |  |  |  |  |  |  |  |
| Product Development | EL671 | x | x | x |  |  | x | x | x |  |  |  |  |  |  |  |  |  |
| Digital Systems Design | EL673 | x |  | x |  | x | x |  |  |  |  |  |  |  |  |  |  |  |
| D.S.P. and Control | EL676 | x |  | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |
| STAGE 4 | Systems Group Project | EL750 |  | x | x | x | x | x | x | x |  | x | x | x | x | x | x | x | x |
| D.S.P. | EL871 |  | o | o | o |  |  |  |  |  | o |  |  |  |  |  |  |  |
| Data Networks and the Internet | EL822 | o |  | o | o | o |  |  |  |  | o | o | o |  |  |  | o |  |
| Biometric Technologies | EL857 | o |  | o | o |  |  |  |  |  | o | o |  |  |  |  | o |  |
| Microcontroller and Computer Architectures | EL896 |  |  | o |  |  |  |  |  |  |  | o | o |  |  |  | o |  |
| Reconfigurable Architectures | EL893 | o |  | o |  | o |  |  |  |  | o | o | o |  |  |  | o |  |
| Embedded Real-Time Operating Systems | EL829 |  | x | x | x |  |  |  |  |  | x | x | x |  |  |  | x | x |
| Business Strategy | CB934 |  |  |  |  |  | x |  | x |  |  |  |  | x | x |  |  |  |

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|  |  | Codes | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 |
| STAGE 1 | Introduction to Electronics | EL305 | x | x |  | x |  | x |  |  |  |  |  |  |  |  |  |
| Engineering Mathematics | EL318 | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Engineering Analysis | EL319 | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Project | EL311 |  | x | x | x |  | x |  | x | x |  |  |  |  |  |  |
| Digital Technologies | EL315 | x | x |  | x |  |  |  |  |  |  |  |  |  |  |  |
| Introduction to OO Programming | CO320 |  |  |  |  | x |  | x |  |  |  |  |  |  |  |  |
| Electronic Circuits | EL303 | x | x |  | x | x |  |  |  |  |  |  |  |  |  |  |
| Intro to Mech Eng and Design | ELxxx |  | x |  | x |  |  |  |  |  |  |  |  |  |  |  |
| STAGE 2 | Digital Implementation | EL568 | x | x |  | x |  | x |  |  | x |  |  |  |  |  |  |
| Microcomputer Engineering | EL560 |  | x |  | x |  | x |  | x | x |  |  |  |  |  |  |
| Computer Interfacing | EL562 |  | x | x |  |  | x | x | x |  | x |  |  |  |  |  |
| Signals and Systems | EL569 | x | x |  | x |  | x |  |  |  |  |  |  |  |  |  |
| Electronic Instrumentation and Measurement Systems | EL565 | x | x | x |  |  | x |  | x |  |  |  |  |  |  |  |
| Image Analysis & Applications | EL561 | x | x |  | x |  |  |  |  |  |  |  |  |  |  |  |
| Communication Principles | EL570 | x | x | x |  |  | x |  |  |  | x |  |  |  |  |  |
| Further Object Oriented Programming | CO520 |  |  |  |  | x | x | x |  |  |  |  |  |  |  |  |
| Year in Industry (IA) | EL791 |  |  |  |  |  |  |  |  |  |  | x |  |  |  |  |
|  | Year in industry (AA) | EL792 |  |  |  |  |  |  |  |  |  |  | x |  |  |  |  |
| STAGE 3 | Project | EL600 |  | x | x | x |  | x | x | x | x | x |  |  |  |  |  |
| Embedded Computer Systems | EL667 |  | x | x | x |  | x |  | x |  |  |  |  |  |  |  |
| Product Development | EL671 | x |  | x |  |  |  | x | x |  |  |  |  |  |  |  |
| Digital Systems Design | EL673 | x | x |  | x | x | x |  | x |  |  |  |  |  |  |  |
| D.S.P. and Control | EL676 | x | x |  | x |  | x |  |  |  |  |  |  |  |  |  |
| STAGE 4 | Systems Group Project | EL750 |  | x | x | x |  | x | x | x | x | x |  | x | x | x | x |
| D.S.P. | EL871 |  | o | o |  |  |  |  |  |  |  |  |  |  |  |  |
| Data Networks and the Internet | EL822 | o |  |  | o |  |  |  |  |  | o |  |  | o | o |  |
| Biometric Technologies | EL857 | o | o |  | o |  |  |  |  |  |  |  |  |  |  |  |
| Microcontroller and Computer Architectures | EL896 |  | o |  | o | o | o | o | o |  | o |  |  | o | o |  |
| Reconfigurable Architectures | EL893 |  | o |  | o |  | o |  |  |  |  |  |  | o | o |  |
| Embedded Real-Time Operating Systems | EL829 |  | x | x | x | x | x |  | x |  | x |  |  | x | x | x |
| Business Strategy | CB934 |  |  |  |  |  |  | x |  | x |  |  | x |  |  | x |

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|  |  | Codes | D1 | D2 | D3 | D4 | D5-D7[[1]](#footnote-1) |
| STAGE 1 | Introduction to Electronics | EL305 | x |  | x | x |  |
| Engineering Mathematics | EL318 | x |  |  |  |  |
| Engineering Analysis | EL319 | x |  |  |  |  |
| Project | EL311 | x | x |  | x |  |
| Digital Technologies | EL315 | x |  |  |  |  |
| Introduction to OO Programming | CO320 |  | x |  |  |  |
| Electronic Circuits | EL303 | x |  |  |  |  |
| Intro to Mech Eng and Design | ELxxx |  | x |  | x |  |
| STAGE 2 | Digital Implementation | EL568 | x |  |  |  |  |
| Microcomputer Engineering | EL560 | x |  |  |  |  |
| Computer Interfacing | EL562 | x | x | x | x |  |
| Digital Signal Processing | EL569 | x |  |  |  |  |
| Electronic Instrumentation and Measurement Systems | EL565 | x |  |  | x |  |
| Image Analysis & Applications | EL561 | x |  |  |  |  |
| Communication Principles | EL570 | x | x |  | x |  |
| Further OO Programming | CO520 |  |  |  |  |  |
| STAGE 3 | Project | EL600 | x | x | x | x |  |
| Embedded Computer Systems | EL667 | x |  |  |  |  |
| Product Development | EL671 |  |  |  | x |  |
| Digital Systems Design | EL673 |  |  |  |  |  |
| D.S.P. and Control | EL676 | x |  |  |  |  |
| STAGE 4 | Systems Group Project | EL750 | x | x | x | x |  |
| D.S.P. | EL871 | o | o | o | o |  |
| Data Networks and the Internet | EL822 | o | o | o | o |  |
| Biometric Technologies | EL857 | o | o | o | o |  |
| Microcontroller and Computer Architectures | EL896 | o | o | o | o |  |
| Reconfigurable Architectures | EL893 | o | o | o | o |  |
| Embedded Real-Time Operating Systems | EL829 | x | x | x | x |  |
| Business Strategy | CB934 | x | x | x | x |  |

Shading represents skills D5-D7 that pervade all modules including the year in industry.

1. [↑](#footnote-ref-1)