Quality Handbook

Programme Specification Template - Undergraduate

SECTION A: CORE INFORMATION

1.	Name of programme:	Computer Systems Engineering
2.	Award title:	BSc Honours
3.	Programme linkage:	Is this part of group of linked programmes between which students can transfer at agreed points?

Yes

This programme is one of a suite of related programmes known as the Stage Three Suite, namely:

BSc (Honours) Computer Systems Engineering
BSc (Honours) Applied Business Computing
BSc (Honours) Network Systems

Although distinct programmes with their own USPs and dedicated top up modules, these programmes also share some Level 6 modules from a suite of long programmes in computing disciplines, namely:

BSc (Honours) Computer Science
BSc (Honours) Web and Mobile Development
BSc (Honours) Business Technology
BSc (Honours) Game Development
BSc (Honours) Cybersecurity and Digital Forensics
BSc (Honours) Networks and Cybersecurity

4.	Is the programme a top-up only?	Yes
5.	Does the programme have a Foundation Year (Level 3) associated with it so that students enter for a four-year programme and progress directly from the Foundation Year to Stage 1 without having to re-apply?	No
6.	Level of award:	Level 6
7.	Awarding Body:	University of Sunderland

8. School: Faculty of Computer Science
9. Programme Studies Board: Undergraduate Computing
10. Programme Leader: Simon Kendal

11. How and where can I study the programme?

At Sunderland:	
Full-time on campus	✓
Part-time on campus	
As work-based learning full-time	
As work-based learning part-time	
As a full-time sandwich course	
As a part-time sandwich course	
By distance learning	

At the University of Sunderland London campus:	
Full-time on campus	
Part-time on campus	
As work-based learning full-time	
As work-based learning part-time	
As a full-time sandwich course	
As a part-time sandwich course	
By distance learning	

At a partner college:	
Full-time in the UK	
Part-time in the UK	
Full-time overseas	✓
Part-time overseas	
By distance learning	
As a full-time sandwich course in the UK	
As a part-time sandwich course in the UK	
As a full-time sandwich course overseas	
As a part-time sandwich course overseas	
As work-based learning full-time in the UK	
As work-based learning part-time overseas	
Other (please specify)	

12. How long does the programme take?

	Min number of years / months	Max number of years / months
Full-time	1	2
Part-time	3	6
Distance learning		
Work-based learning		
Sandwich		

For start-dates please see the current edition of the Prospectus or contact the relevant school at the University. For start-dates for programmes delivered in a partner college, please contact the relevant college.

SECTION B: FURTHER CORE INFORMATION

Use <u>Outline Programme Proposal Form for ADC</u> for questions 13 to 25

26. Learning and teaching strategy.

With a faculty mission statement: *"To be recognised by our students as providing them with an excellent academic experience, preparing them for employment or starting their own enterprise",* it should be evident that student experience is at the core of our thinking in programme conception, design and pedagogical approach. Student experience also motivates our ideas about delivery. In both the curriculum design and the delivery, we have carefully considered the student market (through speaking with potential applicants, current applicants, current undergraduates, and graduates) and reflected on our teaching experience particularly with recent cohorts. Student interests, desires and motivations change rapidly and perhaps particularly so in the domain of technology, and so we are constantly engaged in dialogue with them to complement the experiences and views of our teaching staff, the aims of our institutional Student Success Strategy and within it the Learning, Teaching and Assessment Framework, the professed needs of business and industry, the stipulations of our professional accreditation bodies, and the requirements of the subject benchmark statements, in deciding how to improve our offering. Our aims are to ensure relevance and balance in the curriculum, its delivery and its assessment; timely and meaningful assessment feedback dialogue; and continuity of pastoral care and personal development through a close knit team of programme and level staff and use of module-related e-portfolio.

The Stage 3 Computing Suite programme Computer Systems Engineering sets out to provide a course of study for direct entry at Level 6; it enables students who have achieved a foundation degree or equivalent to 'top up' their accredited prior learning and achieve an honours degree in Computer Systems Engineering. The programme aims to provide a course of study comprised of appropriate strategies for teaching, learning, assessment which take account of student's prior learning contexts and provide a responsive system of individual support. This programme will equip its graduates with the knowledge and abilities to embark on a career in the computing industry. Graduates would enter employment as programmers or developers, with appropriate knowledge and skills in software information systems analysis and programming/development. Additionally all graduates would leave with a set of transferable graduate skills which could be utilised in other career paths e.g. education.

In terms of the curriculum, this means room for development of key skills, and additionally, core computing subject skills, degree-specific (flavour) skills, intellectual/transferable skills to enhance employability, and enterprise skills. In accordance with the University Learning, Teaching and Assessment Framework we strive always to develop independent, active and reflective learners; create learning environments where teaching approaches, learning technologies, and institutional structures and culture foster these learners; and promote learning partnerships in which innovative, supportive and challenging practice, inspires students to approach their courses and careers with curiosity, enthusiasm and creativity.

In terms of delivery we employ a blended teaching and learning approach. The faculty has devoted considerable time in recent years investigating and disseminating in partnership with our students how to engender enthusiasm, creativity and inspiring learning and teaching within our curricula. We have always sought to embed employability into the curriculum and have a long history of working closely with our colleagues in Careers and Employability Services to achieve this, and we have worked consistently to expose our students to real-world industrial activity. Assessment, dealt with in detail in the next section, is carefully thought out in terms of its variety and practicality. Assessment feedback, meanwhile, is of utmost importance to our delivery, and our innovative work in that regard is also detailed in the next section.

We believe that the design of the curriculum provides a balanced and rigorous approach to the development of the skills needed by today's computing graduates working in industry. Certain modules in the offering are very explicit about their skills focus – namely the Product Development, Android Mobile Development, Advanced Data Technologies and Artificial Intelligence modules which all aim to impact upon employability in the computing environment. Others clearly have principles of skills development embedded within but in a much more implicit way. Reflective learning, a key learning strategy to help our students to work independently is embedded into the Research module.

Research Active Curriculum: Research active staff are involved in the delivery of teaching across the complete range of our programmes, and indeed Computer Science Pedagogy is one of our five research themes in the faculty. We actively map teaching teams to modules based on the relevance of their current activities and previous experience. The resulting cross-fertilisation of research and teaching means that our modules remain current in a rapidly developing field. We also encourage staff and students to engage in research activity directly within modules or via extra-curricula schemes. Module LTA approaches are mapped onto Healy's (2005) research-teaching nexus and staff are encouraged to inhabit more than one quadrant in the model so that students are not only exposed to research in an audience capacity but also actively participate and spend time understanding disciplinary processes and developing research skills of their own.

27. Retention strategy.

A major driver behind the development of the Stage 3 Computing Suite of programmes has been the concept of student support and the need to orientate and assimilate students into independent learning at this level. On the Stage 3 suite of programmes there are two modules that are unique to the suite (research, and product development) and each programme shares relevant modules from the undergraduate computing portfolio of long programmes – so students are both supported as a cohort and gain the support of students who have studied at the institution for two or three years.

Pastoral care of students on and off campus is taken very seriously by the faculty. For the Stage 3 Suite of programmes on campus the programme leader also undertakes pastoral care of the students which means that students get to know their personal tutor very quickly and know very quickly where they can go for help and advice. Similarly mechanisms are in place off campus at partner colleges to ensure that students know where to go to for help and advice and have pastoral support throughout their programme of study.

On the very last day of term 3 each year, we hold a showcase and award giving event for all undergraduate students. This is, in part, celebration of our students' achievement and, in part, a chance for them to see each other's work and the nature of what they can achieve. Hence it is also an opportunity for reflecting on progress, for sharing and networking and we feel, therefore, a contributor towards retention, motivation and success.

28. Any other information.

Long computing programmes all incorporate a 40 credit project at Level 6 which involves students working with a client on a project either proposed by external clients, departmental staff or themselves. This project commences during the induction week at the beginning of every academic year, although students find out about the project several months in advance at the end of Level 5. The project is an important component of the Level 6 curriculum giving students the opportunity to clearly demonstrate to employers their ability to work independently to solve real world problems for clients. To provide an equitable learning context for Stage 3 programmes, in this case Computer Systems Engineering, students have a similar student project experience and can achieve the same project learning outcomes through two 20 credit

modules: Research and Product Development which effectively split the 40 credit module into two. This mitigates against any disadvantage that students may have in trying to start a project at the beginning of their programme with no time to find their own client and project, but still provides Stage 3 programme students with opportunities to develop skills in academic research and product development for a client in an authentic learning context and likewise demonstrates to employers that students can undertake independent research and undertake product development for a client to solve a real-world problem. Both on campus and at partner colleges, there is significant emphasis upon providing students with the additional extra-curricular opportunities they need to enhance their employability skills; on campus these opportunities are provided via the Sunderland Futures initiative.

All students have individual access to their Programme (and Module) Leaders on a needs basis and formally timetabled in accordance with the university student support/personal tutoring policy. We also use programme spaces/noticeboards within the VLE, as well as email interaction to provide flexible and efficient communication on day to day issues. Both the VLE and TDS systems allow personal tutors to monitor student engagement and make interventions as appropriate. Programme teams meet with student representatives each term in Staff Student Liaison Committees (SSLCs) in order to formally record issues around the student experience. In many instances, issues can quickly and easily be resolved in this way. In some cases they need referral to the Boards of Study. In either event, the VLE is used as a mechanism for formally feeding back to the students regarding the resolution or otherwise of the issues raised. Lately we have sought to further empower our student representatives in this process by assigning them the role of taking minutes and publicising in programme spaces. Students studying Stage 3 programmes off campus, in this case Computer Systems Engineering are supported at their respective partner centres by appropriate teams of teaching and support staff, have similar representation and are able to engage in consultation activities with staff to ensure that issues can be raised and resolved in a timely manner. Students off campus also have access to the same VLE as students on campus, but any individual issues are dealt with by the partner college so that students get the personal face-to-face resolution of any problems or issues as they arise.

SECTION C: TEACHING AND LEARNING

29. What is the programme about?

The programme aims to provide a course of study, comprised of appropriate strategies for teaching, learning, assessment which will equip its graduates with the knowledge and abilities to enter into the computing industry. Graduates would enter employment as programmers or developers, with appropriate knowledge and skills in software information systems analysis and programming/development. Additionally all graduates would leave with a set of transferable graduate skills which could be utilised in other career paths e.g. education.

The programme will be accessible to students who have an HND or Foundation Degree in a subject related to computer science or 240 credits or equivalent of a recognised UK undergraduate award in a relevant subject. Applications from students overseas will be reviewed to determine that they have suitable equivalent qualifications. There are a range of qualifications that would satisfy the entry requirements and applications are considered individually. This allows those with the appropriate interest, motivation and potential to pursue their personal aspirations and in doing so contribute to fulfil the social and economic requirement for a professional workforce within this field both in the UK and at partner centres overseas and in the shaping of its future development.

More specifically this programme aims to ensure the following:

- To produce highly motivated, technically competent individuals who have the awareness, understanding and the necessary flexibility to effectively utilise and continually re-develop their own knowledge and skills of technologies and tools used within the area of computer systems engineering;
- To produce graduates who are competent programmers and/or developers of software and information systems with experience of up-to-date methodologies, thereby opening up a wide range of employment opportunities;
- To produce graduates with a suitable grounding in the theoretical foundations of computation such that they can derive algorithms and implement them programmatically so that they can solve complex problems;
- To increase a student's theoretical knowledge and focus on current research in the more technical aspects of computing, thus providing graduates who are well-prepared for the challenges of working in the rapidly evolving and competitive computing industry
- To produce graduates with a high level of computing and transferable skills in order that they are ready for a number of career paths and are highly employable and attractive to local, regional and national companies wherever they are studying.

30. What will I know or be able to do at each Stage of the programme?

Students on Stage 3 programmes, in this case Computer Systems Engineering, are expected to have achieved the following Level 4 and Level 5 learning outcomes before embarking on the programme:

Learning Outcomes Level 4 – Skills

			QAA Benchmark
S1	Manage and schedule small projects within both time and resourcing constraints		PRA-3, PRA-6, TRA-5

S2	Apply structured techniques to design, develop and test a range of software solutions	PRA-1, PRA-2, PRA-4, PRA-5
S3	Examine and employ information from a range of sources, such as books, journals and online articles	TRA-2
S4	Identify and make appropriate use of IT resources to communicate effectively	PRA-5, TRA-2

Learning Outcomes Level 4 – Knowledge

		QAA Benchmark
K1	Examine theory and practice in business computing development	COG-1, COG-2
K2	Describe the fundamental operation of computer systems	COG-1, COG-2 COG-3, COG-4
K3	Differentiate between the standards, tools and techniques used in the production of computer based systems	COG-4, COG-5, COG-6, COG-7
K4	Identify problem solving techniques relevant to the discipline	COG-5, COG-6, COG-7, COG-8

Learning Outcomes Level 5 – Skills

		QAA Benchmark
S5	Design and build a range of more complex computer based information systems	PRA-1, PRA-2, PRA-5
S6	Employ a range of analysis and design techniques across key aspects of the systems life cycle	PRA-1, PRA-2 PRA-4, PRA-5, PRA-6
S7	Formulate and evaluate a range of possible solutions to computer based business systems and problems	PRA-5
S8	Work effectively as an individual and/or with others as part of the systems development process	PRA-3, TRA-1, TRA-3, TRA-5

Learning Outcomes Level 5 – Knowledge

		QAA Benchmark
K5	Examination of the broader issues associated with computer based information systems for example, industrial, security, professional, legal and ethical	COG-1, COG-8
K6	Knowledge of the key aspects of the software systems life cycle, their integration and application to solve more complex problems	COG-5, COG-6, COG-7
K7	Knowledge of a range of specialist computing techniques and how they might be applied effectively to solve relevant problems	COG-1, COG-2, COG-3, COG-5
K8	Familiarity with the principles of evaluation within the software systems life-cyle	COG-6, COG-7

It is expected that students will have achieved all the learning outcomes at Levels 4 and 5 above either in partner colleges or other institutions, in order to prepare them for entry onto the University of Sunderland B.Sc. Computer Systems Engineering programme, whether this is delivered on or off campus at partner colleges.

Learning Outcomes Level 6 - Skills

By the end of Level 6 successful students should know, understand or be able to do the following:

		QAA Benchmark
S9	Formulate independent research in order to identify appropriate methods, tools, and techniques to address complex problems	TRA-2, PRA-4, PRA-5, TRA-6
S10	Design, create and evaluate complex software artefacts using a range of developmental methods, languages and platforms	TRA-5, PRA-1, PRA-4, PRA-5
S11	Learn, critically appraise and evaluate new concepts in preparation for the life-long challenge of working in a continually changing environment.	PRA-2, TRA-1, TRA-3, TRA-6, TRA-7

Learning Outcomes Level 6 – Knowledge

By the end of Level 6 successful students should know, understand or be able to do the following:

		QAA Benchmark
K9	The synthesis, evaluation and dissemination of knowledge through the application of research methods in computing	COG-1, COG-2 COG-5, COG-7, COG-8
K10	Critical understanding of the theory, principles and practices that underpin the design, development, evaluation and documentation of complex software artefacts	COG-1, COG-2, COG-3, COG-4, COG-5, COG-6, COG-7

K11	An in-depth understanding of the state of the art in specialist areas of computing e.g. AI Artificial Intelligence and mobile technologies	COG-1, COG-2, COG-3

Learning Outcomes – Ordinary degree

If you are awarded an Ordinary degree you will have achieved the majority of the learning outcomes for the programme studied. However you will have gained fewer credits at Level 6 than students awarded an Honours degree, your knowledge will typically be less broad and you will typically be less proficient in higher-level skills such as independent learning. As such the learning outcomes will be a sub-set of the Level 6 learning outcomes.

31. What will the programme consist of?

Each undergraduate programme consists of a number of Stages from a minimum of 1 to a maximum of 4, each of which is equivalent to a year's full-time study. The summary below describes briefly what is contained in each Stage. Most programmes have a mixture of core (i.e. compulsory) modules and optional ones, often with increasing choice as you move through the programme and gain in experience. In some programmes the choice of optional modules gives you particular 'routes' through the programme. The programme structure including a detailed list of modules can be found in the programme regulations.

All students on the Stage 3 Computing Suite, including the Computer Systems Engineering programme undertake the following 20-credit modules: CET351 Research and CET333 Product Development. In the CET351 Research module students undertake advanced study in order to define, plan and a develop a proposal for a research investigation and scope, plan, develop and produce an academic research 'paper'. To undertake this module students utilise online bibliographic databases to search for relevant research papers, assimilate and evaluate research, present reasoned arguments and develop advanced writing skills. In the CET333 Product Development module students work with a client to develop a practical solution to a business problem, using up-to-date practitioner methods across the project life cycle.

The core modules for Computer Systems Engineering which give the programme its distinctiveness are CET324 Advanced Cyber Security, CET343 Android Mobile Development, CET341 Advanced Data Technologies and CET313 Artificial Intelligence. In CET324 Advanced Cyber Security students will evaluate the professional requirements of a cybersecurity practitioner and apply the principles and techniques to effectively design and implement computer systems that minimise security risks. In CET343 the aim of the module is to enable students to build a highly interactive and dynamic native mobile application. This will include understanding the systems involved, from device hardware and software on which information is stored, including the platform database technologies used to structure and access data, to the media rich interface features needed to create good user experiences which leverage the native mobile platform. CET341 Advanced Data Technologies covers how traditional and newer data models and database technologies support real world demands of data. It will investigate various data architectures and how they can represent structured and unstructured data in traditional and BigData systems; methods for designing, developing and maintaining these data systems; and tools for data access and analysis including Data Analytics tools and how they are used in areas such as Data Science. In CET313 Artificial Intelligence, the aim is to provide an a broad introduction into AI techniques and a detailed understanding in the application of some critical approaches, so that when students go into industry or research, they will be able to choose and develop a solution using the correct AI techniques for the problems which arise.

32. How will I be taught?

Scheduled teaching activities	✓
Independent study	✓

As a subject area, computing is very hands-on yet it also requires the facility for developing mastery of theoretical and technical principles as well as generic and transferable skills. Thus our physical and virtual learning environments must offer diverse opportunities. The core of our teaching building is formed of several computer 'cells' or labs used for hands-on tutorials and project work, surrounded by traditional large lecture theatres. Within this physical environment we teach through lectures, interactive lectorials, lab-based practicals, classroom based seminars and group problem solving sessions, case studies, guest expert lectures, one-to-one and group supervisions. Our students use PCs, and mobile devices, including their own phones (which we have seen enhances understanding of different platforms and increases motivation, as well as provides portability of their work to show family members, friends and potential employers during interview). Lectorial rooms are smaller than lecture theatres and allow interactive teaching while students work at PCs under the lecturer's direction. Practical sessions for networking, telecommunications, game development and cybersecurity take place in specialised labs. We have a dedicated Learning Lab for interactive group work scenarios. In addition, our students use 'break out' areas with comfortable seating and refreshment areas where they can chat and engage in collaborative learning.

Outside of the university buildings, our partnerships with key technology providers like Microsoft and CISCO allow us to offer a large range of free or heavily discounted software downloads for student home-study. We also use the VLE to provide directed reading and development tasks, group online discussions, eportfolio development, wikis etc. Students can access staff, module descriptors, handbooks, MyModuleResources, taught materials, external resource links, online submission and the eportfolio through the VLE.

A list of the modules in each Stage of the programme can be found in the Programme Regulations.

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the Matrix of Modes of Teaching.

33. How will I be assessed and given feedback?

Written examinations	✓
Coursework	✓
Practical assessments	✓

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the Matrix of Modes of Teaching.

The generic assessment criteria which we use can be found here. Some programmes use subject-specific assessment criteria which are based on the generic ones.

This programme uses the Generic University Assessment Criteria	**YES**	~~NO~~
This programme uses the Subject Specific Assessment Criteria	**YES**	~~NO~~

The University regulations can be found here.

Each September the school staff engage in a week long LTA conference which involves assessment consideration, thinking about Universal Design for Learning (UDL), Research Active Curriculum (RAC) for example as well as assessment scheduling to determine when assessments will take place for each module and ensure that every programme, and hence every student, has an assessment load that is fairly balanced across the year.

Similarly for off campus students the mode of study [full-time or part-time], schedule of teaching and assessment submissions are considered very carefully at least six months in advance of the start of the academic year to ensure that they meet with the local arrangements, taking into account the national/cultural context and taking into account national holidays in the country where students are studying. Across all computing programmes and levels much assessment is based around practical work as the subject dictates usually consisting of the development of computer systems, components or assets – the extent and nature of which depends upon the programme. For students on Computer Systems Engineering, assessment is also based around the design, development and testing of complex systems. At Level 6 we see more exams generally for our students, but these are not used right across the module catalogue and the number of exams taken by students on all Stage 3 computing programmes is very carefully managed. While students engage in assessed group-work at stages 1 and 2, summative group assessment is discouraged entirely at Level 6, so although students on the Computer Systems Engineering programme will engage in group work activities both on and off campus to develop the team working skills they need for the workplace, students will never be assessed as a group.

Our feedback approach in all three stages of our programmes is underpinned by our experience of the ESWAF project (Engaging Students with Assessment Feedback) in which the university was a cascade partner and this faculty a contributor. Our feedback models include the use of peer review, CRAFTing and generic feedback which allow partial submissions that are commented on with the opportunity to further improve, and the use of exemplars to help students understand what is expected of them. Learning and teaching approaches developed for modules delivered on and off campus are carefully crafted to ensure that students enjoy the same learning experience wherever they are studying.

The University aims to return marked assessments and feedback within 4 working weeks of the assignment submission date after internal moderation processes have been completed. If this is not possible, students are notified by the Module Leaders when the feedback is available and how it can be obtained. Where possible, in part we aim to feedback more immediately than 4 weeks by the use of live demos of developed artefacts.

The Academic Misconduct Regulations and associated guidance can be found here. It is the responsibility of students to ensure they are familiar with their responsibilities in regards to assessments and the implications of an allegation of academic misconduct.

Students should refer to the University Regulations for information on degree classifications and compensation between modules.

34. Teaching, learning and assessment matrix

Code	Title	Status	Modes of T&L	Modes of Assessment	Learning Outcomes					
					K9	K10	K11	S9	S10	S11
CET351	Research	Core	Lectures, Workshops, Individual Tutorials	CW – Research Proposal CW – Research Paper	TDA		TDA	TDA		TDA
CET333	Product Development [module renamed]	Core	Lectures, Workshops, Individual Tutorials	CW – Portfolio		TDA	TDA		TDA	TDA
CET324	Advanced Cyber Security	Core	Lectures, Seminars, Practical Classes	CW – Report CW – Design and Implementation		TDA	TDA			TDA
CET343	Android Mobile Development	Core	Lectures, Lab activities	CW – Portfolio	TDA	TDA	TDA		TDA	TDA
CET341	Advanced Data Technologies	Core	Lectures, Tutorials	CW – Practical assignment and report	TDA		TDA	TDA	TDA	TDA
CET313	Artificial Intelligence	Core	Lectures, Tutorials, Practical Classes	CW – Mini-project Exam		TDA	TDA		TDA	TDA

35. How does research influence the programme?

Research within the Faculty of Computer Science is organised into a Research Institute. The Research Institute for FCS focuses on developing and implementing sustainable research in FCS, providing a nurturing, supportive, developmental, inclusive research culture. The institute has five main strands of research; Cybersecurity, Data Science, HCI/UXD, AI/Machine Learning, and Pedagogic Research in Computer Science. Each of these draws from a number of areas both within and beyond FCS. Drawing our research together under these strands allows us to clearly identify the ways in which clusters of researchers bring their different subject expertise together to tackle a range of interesting research problems in the digital economy. Moreover, it is also a risk mitigation strategy since it enables subject specific expertise to develop while still leaving robust strands of research.

AI/ML research has impact in knowledge-intensive industries. The focus of informatics is on the software components of ICT, information methodologies and aligning IT at systems level with organisations, people and processes. Much of the work in this area is carried out as applied research/ knowledge transfer activity in collaboration with companies, and staff involved in these activities have used case studies in their teaching e.g. in CET313 and CET315.

Data Science research has impact wherever analysis of large-scale complex data is useful. For instance, it enables businesses and policy makers to determine trends; it can be used in disease prevention; preventing terrorist attacks; cybersecurity; combatting crime and in the discovery of new scientific knowledge. Interesting areas of current work include algorithmic analyses that prevent terrorist attacks; intelligent intrusion detection; and digital forensics work. These directly feed into our undergraduate provision e.g. in modules CET313 and CET324.

Cybersecurity research in the FCS has a direct impact on the teaching of this programme informing CET324. Current cybersecurity research focusses on incident response (cross over between digital forensics and cybersecurity), threat sharing policies and strategies, and gender issues in cybersecurity.

HCI/UXD research has impact wherever digital technologies are used at a personal level. For instance in education, learning, domestic activity, exercise, promoting secure on-line behaviours in users. Significant work in this strand has focused on improving Usability Evaluation Methods by empirically testing the contribution of usability methods (e.g. Think-aloud testing) to usability problem discovery and analysis. Our research also focuses on studying those factors that influence behaviour with technology, for example, those aspects of design that are related to credibility and trust, that promote behaviour change in the context of healthy living, or safer internet transactions. The usability evaluation research feeds directly into the usability strands that go though each year of the undergraduate degrees and can be seen in the CET300 project, CET233 Software Enterprise Project, CET101 and CET308.

Given the applied nature of our research Industrial Engagement is key to our activities. For instance our engagement with Sage and Nexus has led directly to the production of teaching materials and case studies for our level 6 UXD students (CET308). Our collaborative research involves over 150 industrial collaborators and informs the design and development of our curriculum.

The fifth strand of our research is Pedagogic Research in Computer Science and this has a hugely important impact on our curriculum delivery. Staff interests and publications in assessment; authenticity in learning, teaching and assessment; student motivation; creativity in HE; student engagement; the Inspiring Teacher; eportfolios; and gamification, to name a few topics, have all contributed to developments in our LTA approaches over recent years.

Moreover, we operate to the institution's Research Active Curriculum commitment. In our assessment planning week each September we discuss and record where each module may map onto the Healey (2005) model of the research active curriculum, so we have a mix of

research based (students undertake enquiry based learning activities), research orientated (we teach the students 'how to research'), research led (our subject-based research is disseminated in the curriculum), and research tutored (students actively participate in research activities) student learning situations, and we actively seek to achieve all modules working in more than one of those 4 quadrants.

SECTION D: EMPLOYABILITY

36. How will the programme prepare me for employment?

The programme gives you the opportunity to develop skills which you can use in the future. Some skills are more specific than others to the subject area, or to a particular type of activity, but all skills can be applied in a range of employment situations, sometimes in quite unexpected ways. The skills which this programme is designed to develop are listed below.

We aim to ensure our programmes prepare students for employment both through our close ties with business and industry, and through the curricula and the manner in which we facilitate our students' learning.

For every approval/re-approval, we include employers in the development process and consult industrial, PSRB, sector skills and academic staff at appropriate junctures. Staff undertaking industrial placement visits provide feedback from placement companies, and real-world industry-consultative activities like the Stage 2 Software Enterprise Project and Stage 3 Individual Project ensure employer input to our provision not just for the long programmes but also for the Stage 3 Suite.

We have an active Industrial Advisory Board comprising colleagues from international, national and local business including IBM, SAGE, BA, Leighton Group, Accenture, HP, Tombola, Sunderland City Council, Sapphire, Northumbria Police, and CISCO. This provides a forum for discussion that in turn informs the Faculty's syllabi and curricula, thereby enhancing the student experience. The IAB obtains input on employer needs and expectations of graduate and placement student skills and abilities; shares developments in FCS to obtain industrial viewpoints; discusses opportunities for industrial input to the delivery of the curricula through guest lectures, projects, case studies, assessment briefs, prizes and engagement with Sunderland Futures; and discusses opportunities for collaboration in research, reach out and employability matters.

We are represented on local employer groupings including DYNAMO, Digital Leaders North East, the North East Fraud forum as well as the relevant PSRBs. The work undertaken with these groups has developed strong relationships increasing employer input e.g. SAGE and Accenture have worked closely with us in addressing the curriculum and employability skills needs. Colleagues in the Faculty have been part of national working groups on cybersecurity in the CS curriculum and the output from these working groups has been included in the curriculum including in the final year specialism in "Advanced Cybersecurity" Present on one of the Stage 3 Suite programmes). Two colleagues also contributed to a national project for CPHC (Council of Professors and Heads of Computing) called GECCO – Building a Graduate Employability Community in Computing. https://cphc.ac.uk/2017/08/03/gecco-evaluation-report/ The Faculty initiatives in that project revolved around the Placement Champions and 'Employable Me' projects – the latter being a specifically Stage 3 Suite focused project.

In terms of student skills development, we ensure a wide range of learning activities so that students are adequately prepared to work individually and in teams, on analytical problem solving, and in practical scenarios of designing/building/testing/evaluating. Computer Science as a field focuses on problem solving and students do this from day one. We integrate colleagues from the Careers and Employability Service into our module delivery, and clear links are made to the activities of Sunderland Futures. Practitioners from business and industry provide research seminars, presentations, demonstrations and master classes to illustrate the opportunities in employment and to inspire students. We also incorporate hackathon type activities into the curriculum.

This programme will equip its graduates with the technical knowledge and abilities to embark on a career in the computing industry. Graduates would enter employment as programmers and/or developers, with appropriate knowledge and skills in software information systems analysis and programming/development. Additionally all graduates would leave with a set of transferable graduate skills which could be utilised in other career paths e.g. education.

The institution also tracks graduate destinations through the annual Destination of Leavers from Higher Education survey.

For information about other opportunities available to our students who study on campus, click here.

Additional opportunities to develop your experiences more widely will vary if you study at one of our partner colleges. For information about the extra-curricular activities available in any of our colleges please contact the college direct.

37. Particular features of the qualification (optional)

The programme will operate under the standard MCS regulations subject to the following addition:

(i)   n/a

38. Professional statutory or regulatory body (PSRB) accreditation.

PSRB accreditation is not relevant to this programme	✓
PSRB accreditation is currently being sought for this programme	
This programme currently has PSRB accreditation	

The programme is currently accredited until: n/a

The implications of the accreditation not being renewed are: N/A

Please see PSRB Renewal Process for information on the renewal process.

The relevant PSRB(s) is/are:

The terms of the accreditation are as follows:

The programme is recognised as:

Accreditation gives graduates (status / exemption):

This depends upon successful completion of the programme.

Is membership of the PSRB dependent on further requirements? N/A

There are programme-specific regulations relating to the following. Details are given in the programme regulations:

The modules to be studied	
Pass-marks for some or all modules and/or parts (elements) of modules	
Requirements for progression between one Stage and another	
Placement requirements	
Attendance requirements	
Professional practice requirements	
Degree classification	
Other	

Interim or exit awards are not accredited.

SECTION E: PROGRAMME STRUCTURE AND REGULATIONS

Complete and insert Part B of the <u>Programme Regulations Form</u>, for questions 39 and 40

SECTION F: ADMISSIONS, LEARNING ENVIRONMENT AND SUPPORT

41. What are the admissions requirements?

The University's standard admissions requirements can be found in the <u>university regulations</u>. Programme-specific requirements which are in addition to those regulations are given below.

The current entry requirements for this programme is as specified in the Fees and Entry Requirements section on the programme page on the University's website.

Can students enter with advanced standing?	**Yes**	~~No~~

If yes, to which Stages?

Stage 1	
Stage 2	
Stage 3	Yes

Stage 4	

If yes, with what qualifications?

The programme will be accessible to students who have an HND or Foundation Degree in a subject related to computer science or 240 credits or equivalent of a recognised UK undergraduate award in a relevant subject. There is a range of qualifications that would satisfy the entry requirements and applications are considered individually.

Articulation agreements from overseas institutions would be considered for stage 3. The University Articulation regulations and processes would be put in place.

42. What kind of support and help will there be?
a. in the faculty:

All students have individual access to their Programme (and Module) Leaders on a needs basis and formally timetabled in accordance with the university student support/personal tutoring policy. We also use programme spaces/noticeboards within the VLE, as well as email interaction to provide flexible and efficient communication on day to day issues. Both the VLE and TDS systems allow personal tutors to monitor student engagement and make interventions as appropriate. Programme teams meet with student representatives each term in Staff Student Liaison Committees (SSLCs) in order to formally record issues around the student experience. In many instances, issues can quickly and easily be resolved in this way. In some cases they need referral to the Boards of Study. In either event, the VLE is used as a mechanism for formally feeding back to the students regarding the resolution or otherwise of the issues raised. Lately we have sought to further empower our student representatives in this process by assigning them the role of taking minutes and publicising in programme spaces.

A major driver behind the development of the Stage 3 suite of computing programmes has been the concept of student support and the need to orientate and assimilate students into independent learning at this level. On the Stage 3 suite of programmes there are two modules that are unique to the suite (research, and product development) and each programme shares relevant modules from the undergraduate computing portfolio of long programmes.

Pastoral care of students on and off campus is taken very seriously by the faculty. For the Stage 3 Suite of programmes on campus the programme leader also undertakes pastoral care of the students which means that students get to know their personal tutor very quickly and know very quickly where they can go for help and advice. Similarly mechanisms are in place off campus at partner colleges to ensure that students know where to go to for help and advice and have pastoral support throughout their programme of study.

Finally, students may seek support from the on-site Faculty Student Liaison Officer and Students Union during their studies.

b. in the university as a whole:

The University provides a range of professional support services including <u>wellbeing</u>, <u>counselling</u>, <u>disability support</u>, and a <u>Chaplaincy</u>. Click on the links for further information.

c. in a partner college:

Please see the relevant college prospectus or website for details of student support if you are planning to study in one of our partner colleges.

43. What resources will I have access to?

On campus	✓	In a partner college	✓	By distance learning	

On campus

Tick all that apply

General Teaching and Learning Space	✓
IT	✓
Library	✓
VLE	✓
Laboratory	✓
Studio	
Performance space	
Other specialist	✓
Technical resources	✓

Technical learning resources for the Faculty are supported by dedicated technicians, 3 specifically for FCS and 6 central support technicians. The technicians are managed by the FCS Technical Manager who is a member of the Faculty Management Team and who works very closely with the academic staff to ensure the appropriateness of resources.

There is a range of learning resources available to students in FCS subjects. Normal access to resources during term time is Mon-Fri 8am-9pm hours, although some specialist facilities have restricted access with academic staff and technical staff managing access to normally locked resources. If specialist labs are free they can be accessed via a signing in procedure available from the IT Helpdesk in DGIC. Available hardware includes the Computing suite in the David Goldman Informatics Centre which is organised into a set of 7 cells each of 25 machines for teaching and an open access suite of 67 units comprises of PCs and MACs. There are a total of 242 workstations (217 PCs and 25 Macs) on the terraces. The specification of these machines are PCs vast majority Intel i3 ranging to intel i7's. In addition there are specialised CISCO and Forensic facilities in 6 laboratories. These contain 125 PCs with Cisco networking kit, PICO cell and virtualisation setups.

These labs cater for Networking, Cybersecurity and Digital Forensics courses. The total number of available seats is thus 375. Cells are available to all students within the University if not timetabled. In DGIC there is a Learning Lab which comprises 7 Smart boards with connecting laptops which is capable of linking all smart boards from one input. We are also trialling the set up of a Problem Based Learning area.

A rolling replacement programme for computing equipment is operated with local (formerly School of CAT) and central funding available for hardware and software upgrades each year. This rolling replacement programme is continuing and we have a 5-year plan in place.

Off campus, partner centres must provide students with the computing resources needed to undertake their studies on the Computer Systems Engineering programme and this provision is regularly reviewed to ensure that it meets the needs of the students.

Information about the University's facilities can be found here.

Please see the relevant college prospectus or website for details of college learning resources if you are planning to study in one of our partner colleges.

44. Are there any additional costs on top of the fees?

No, but all students buy some study materials such as books and provide their own basic study materials.	✓
Yes (optional) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are additional costs for optional activities associated with the programme (see below)	
Yes (essential) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are essential additional costs associated with the programme (see below)	

45. How are student views represented?

All taught programmes in the University have student representatives for each Stage (year-group) of each programme who meet in a Student-Staff Liaison Committee (SSLC) where they can raise students' views and concerns. The Students' Union and the faculties together provide training for student representatives. SSLCs and focus groups are also used to obtain student feedback on plans for developing existing programmes and designing new ones. Feedback on the programme is obtained every year through module questionnaires and informs the annual review of the programme. Student representatives are also invited to attend Programme and Module Studies Boards which manage the delivery and development of programmes and modules. Faculty Academic Committee, also has student representation in the form of the School Coordinator – a student with a stipended role of liaison between students, student reps and the faculty. This allows students to be involved in higher-level plans for teaching and learning. At university level Students are represented on University level Committees by sabbatical officers who are the elected leaders of the Students' Union. At faculty level we have a student Computing Society which as well as serving the wishes of the student members acts in a liaison role with us.

The University's student representation and feedback policy can be found <u>here</u>.

Students from the Stage 3 Suite are also invited to complete Survey Us, which for these students is the UKES. The results of this are discussed at Programme Studies Boards and at Faculty Academic Committee to identify good practice which can be shared and problems which need to be addressed. We rely heavily on student input to interpret the results of Survey Us and ensure that we make the most appropriate changes.

SECTION G: QUALITY MANAGEMENT

46. National subject benchmarks

The Quality Assurance Agency (QAA) for Higher Education publishes benchmark statements which give guidance as to the skills and knowledge which graduates in various subjects and in certain types of degree are expected to have. These can be found <u>here</u>.

Are there any benchmark statements for this programme?	**YES**	

The subject benchmark(s) for this programme is/are:

Computing (February 2016) <u>http://www.qaa.ac.uk/en/Publications/Documents/SBS-Computing-16.pdf</u> In this documentation we have used a mapping notation onto the benchmark statements, e.g. COG-1, PRA-3.

The QAA also publishes a Framework for Higher Education Qualifications (FHEQ) which defines the generic skills and abilities expected of students who have achieved awards at a given level and with which our programmes align. The FHEQ can be found <u>here</u>.

47. How are the quality and standards of the programme assured?

The programme is managed and quality assured through the University's standard processes. Programmes are overseen by Module and Programme Studies Boards which include student representatives. Each year each module leader provides a brief report on the delivery of the module, identifying strengths and areas for development, and the programme team reviews the programme as a whole. The purpose of this is to ensure that the programme is coherent and up-to-date, with suitable progression from one Stage to another, and a good fit (alignment) between what is taught and how students learn and are assessed - the learning outcomes, content and types of teaching, learning and assessment. Student achievement, including progress between Stages of the programme and degree classification, is kept under review. The programme review report is sent to the Programme Studies Board and the Faculty in turn reports issues to the University's Quality Management Sub-Committee (QMSC).

External examiners are appointed to oversee and advise on the assessment of the programme. They ensure that the standards of the programme are comparable with those of similar programmes elsewhere in the UK and are also involved in the assessment process to make sure that it is fair. They are invited to comment on proposed developments to the programme. Their reports are sent to the Deputy Vice-Chancellor (Academic) as well as to the Faculty so that issues of concern can be addressed.

All programmes are reviewed by the University on a six-yearly cycle to identify good practice and areas for enhancement. Programmes are revalidated through this review process. These reviews include at least one academic specialist in the subject area concerned from another UK university. Quality Assurance Agency (QAA) review reports for Sunderland can be found <u>here</u>.

Further information about our quality processes can be found <u>here</u>.

Please also complete and insert the <u>SITS form</u>.

SITS SUMMARY PROGRAMME/SHORT COURSE DETAILS

(Form to be completed electronically by the Faculty and forwarded to the Quality Support Officer supporting the Approval event, or sent to Planning & MI for faculty devolved processes before sending to Quality Support (with the exception of Short Courses and GRS))

This form is to be completed when a new programme has been validated and approved so that the programme codes and progression and awards rules can be set up in SITS. This also needs to be completed at periodic course review when there have been significant modifications to the course.

Please note that all details entered onto this form will go onto every student's record that is attached to this programme and it is therefore imperative that the information is correct.

1 Programme Details		
New/ Modification/Review: Please ensure the minor modification document is included	Review	
Full Programme Title:	BSc (Hons) Computer Systems Engineering	
If replacement for existing course, specify title and course code:		
Qualification Aim: e.g. Foundation degree of Science, Bachelor of Arts (Honours)	Bachelor of Science (Honours)	
Qualification Level (NQF level):	BSc (hons) – level 6	
JACS 3.0 code JACS code = e.g. (V100) History, (I100) Computing Science, etc. See HESA Website https://www.hesa.ac.uk/jacs3	I100	
Is the programme Open or Closed: A course is defined as closed when specifically designed for a certain group of people and not also available to other suitably qualified candidates. It may be designed for a particular company however if the same course is also run for other suitably qualified candidates, not employed by the company, then the course is not closed.	Open	
Faculty and School:	Faculty of Computer Science	School of Computer Science
Location of study: e.g. SAGE, Sunderland in London, Sunderland	Sunderland	
Last Date Registration (PBI) Number of days: The number of days after the start date of the course that it is possible for students to register onto it. It is also referred to as the migration date.		
Programme Leader:	Simon Kendal	
Academic Team for the programme:	Computer Science	
Date of Approval/Modification/Review:	26/04/18	
Date of next review (*QS to complete*):		

Accrediting Body or PSRB If yes please attach a completed PSRB form	No
Programme Specific Regulations If yes, please attach a completed Programme Specific Regulations form	No
Does this programme come under the Key Information Set return? If yes, please attach a completed KIS form	Yes
Is this an undergraduate programme whose primary (but not necessarily only) purpose is to improve the effectiveness of practitioners registered with a professional body? If yes, please specify which body: http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/2016/201622/HEFCE2016_22.pdf (Page 88, paragraph f) e.g. a short course aimed at registered nurses	No

Interim Awards

If a student does not achieve their qualification aim, what lower awards might they be entitled to, assuming they have the credits? The subject title for any lower level award should be given where this is different from the subject of the qualification aim.

	Interim Award Title	Credits Required	Interim Structure Please show mandatory requirements if applicable e.g. core module codes
1	Ordinary degree in Computer Systems Engineering	60 level 6	Any 60 from CET333, CET324, CET313, CET341, CET343, CET351
2			
3			

Combined Subjects Programmes only	
Will the subject run as Major/Minor/Dual:	
Any subject(s) not permitted to be combined with this subject:	

2 Mode Of Attendance		
01	Full-time *Full-time students are those expected to study for more than 24 weeks per year, for a minimum of 21 hours per week and are paying the full-time fee.*	Yes
02	Other Full-time *Students who attend full-time for a period less than 24 weeks per year*	No
31	Part-time *Students who are expected to study for less than 21 hours per week.*	No
31	Part-time at Full-time Rate *Students who are studying full-time credits over part-time attendance*	No

3 Admissions An admissions or MCR code will be created to allow student applications.		Tick appropriate
U	UCAS Universities and Colleges Admission Services *Required for full-time undergraduate programmes only.*	✓
D	Direct Entry *Required for FT, PT, PG and PGR, only where students will be admitted though the admissions teams or where the programme needs to be advertised on the web*	✓
G	GTTR Graduate Teacher Training Registry *Education only, where applicable*	

4 Collaborative Provision		UK	No	
		Overseas	Yes	
Institution		Collaborative Model		Funding Arrangements
Botswana Accountancy College, Gaberone and Francistown		Full Franchise		

5a Course Block	
Full-time - Overall length of the programme in months:	12
Part-time - Overall length of the programme in months:	n/a
Does this course offer a sandwich placement? If **yes**, please indicate which programme year this placement is to take place.	No Programme Year:
Is this compulsory or optional?	n/a
Does this course offer a study abroad year out? If **yes**, please indicate which programme year this placement is to take place.	n/a
Is this compulsory or optional?	n/a

6 Major Source of Funding **Please note** this relates to funding for the programme and **not** individual students	
HEFCE Higher Education Funding Council for England	Yes
Skills Funding Agency/EFA/Degree Apprenticeship	
NCTL National College for Teaching and Leadership	
Wholly NHS Funded Partially NHS Funded Departments of Health/NHS/Social Care. ***For all Health funded programmes please indicate whether the programme is eligible for an NHS Bursary*** - Eligible for NHS Bursary Y/N	
Standard Fee If no then the Learning Resources Form should be attached	Yes
Other Funding:	
– Please Specify:	

7 Education Programmes Only This section must be completed for any programmes marked above as 'NCTL' funded	
Teacher Training Identifier:	

Teacher Training Scope:	
Qualification Aim: QTS and academic award, QTS only, QTS by assessment only	

DETAILS SUPPLIED BY: …Simon Kendal……   DATE: 31/01/18………………………..

Module List

Award, Route (if applicable) and Level	New/Existing/ Modified Module (N/E/MM)	Module Title	Module Code	Module Credit Value	Whether core or option	Must choose (i.e. designated option)	Assessment weighting – give % weight for *each assessment item*	Pre-/co-requisites	Module leader	Other comment (if required)	Date of Entry on SITS. N/MM only (After event)	JACS Code	Academic Team
6	E	**Research**	**CET351**	**20**	**C**		**CW 50% CW 50%**		**Simon Kendal**			**I100**	**Simon Kendal**
6	E	**Product Development**	**CET333**	**20**	**C**		**CW 100%**		**Susan Jones**			**I100**	**Susan Jones**
6	E	**Advanced Cyber Security**	**CET324**	**20**	**C**		**CW 40% CW 60%**		**Alastair Irons**			**I100**	**Alastair Irons**
6	MM	**Android Mobile Development**	**CET343**	**20**	**C**		**CW 100%**		**Paolo Modesti**			**I100**	**Paolo Modesti**
6	MM	**Advanced Data Technologies**	**CET341**	**20**	**C**		**CW 100%**		**David Nelson**			**I240**	**David Nelson**
6	E	**Artificial Intelligence**	**CET313**	**20**	**C**		**CW 50% Exam 50%**		**Chris Bowerman**			**I100**	**Chris Bowerman**