



## Course Information Form

This Course Information Form provides the definitive record of the designated course

### General Course Information

Course Title	Computer Systems Engineering Computer Systems Engineering (with Professional Practice Year)
Qualification	BEng (Hons)
FHEQ Level	Level 6
Intermediate Qualification(s)	None
Awarding Institution	University of Bedfordshire
Location of Delivery	AA- Park Square Luton AD – University of Bedfordshire Campus Milton Keynes
Mode(s) of Study and Duration	Full-time over 3 years Full-time with Professional Practice Year over 4 years Part-time pathway typically over 6 years
Professional, Statutory or Regulatory Body (PSRB) accreditation or endorsement	The Institution of Engineering and Technology - The IET
UCAS Course Code	H650
External Benchmarking	<i>QAA Subject Benchmark Statement: Engineering, Feb 2015</i> <i>QAA FHEQ Level descriptors (QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland, August 2008)</i>
Entry Month(s)	October, February

### Why study this course

Computer System Engineering emphasises computer techniques, algorithms, tools and skills that support R&D of modern electronic/electrical engineering and modern computer techniques and skills of programming. Computer System Engineering is such a multidisciplinary course that aims to meet the industry requirements. Computers System Engineering helps you develop computer techniques and skills which are transferable and applicable in many industry and other R&D areas. The teaching team has previous theory and practice experience on:

- Creatively apply computer technologies
- Focus on interdisciplinary study

- Foster hands-on skills
- Develop problem-solving skills.

### Educational Aims

The curriculum structure consists of subjects that allow students to gain fundamental knowledge and to further explore advanced computer and electrical/electronic engineering techniques, to develop skills of applying the techniques to innovatively resolve real-world engineering problems, as well as to develop communication and team-working skills.

This course aims

- To develop personal skills so that students have confidence and ability to express their creativity both individually and as part of a team
- To promote a responsible attitude towards the use of the computer hardware and software
- To facilitate students' understanding of the fundamentals of computer technologies and electrical/electronic engineering techniques
- To facilitate students' ability to apply the techniques to resolving real-world engineering problems
- To promote students awareness of the cultural, social, political, economic and ethical implications in computer science and electrical/electronic engineering.

The emphasis of the course is to provide vocationally skilled engineers who have both a general overview of the discipline of computer techniques and engineering domain knowledge as well as skills of solving real-world problems with the knowledge.

The design philosophy recommended by IEEE/ACM has informed these aims i.e. to use a realistic pragmatic applied approach, rather than a theoretical treatment whenever possible.

During the course of your studies you will be developing your knowledge, skills and wider attributes. The broad intentions are set out in the course learning outcomes. These indicate what you should be able to do by the end of the course.

The emphasis of the programme learning outcomes is upon developing a broad based set of skills that can be used to systematically manage the application of AI to robotics.

### Course Structure

The Units which make up the course (including the Professional Practice Year as applicable) are:

Unit Code	Level	Credits	Unit Name	Core or option
			Year 1:	
CIS018-1	4	30	Fundamentals of Computer Studies	Core
CIS020-1	4	30	Introduction to Software Development	Core
CIS034-1	4	30	Engineering Mathematics	Core
CIS038-1	4	30	Foundations of Electronic Systems and Computer Networks	Core

Year 2				
CIS006-2	5	30	Concepts and Technologies of AI	Core
CIS016-2	5	30	Object Oriented Programming and Software Engineering	Core
CIS047-2	5	30	Circuit Analysis & Signal Processing	Core
CIS097-2	5	0	Professional Practice Year (Computer Science and Technology)	Option
CIS048-2	5	30	DSP and Embedded Systems Development	Core
Year 3				
CIS013-3	6	30	Research Methodologies and Emerging Technologies	Core
CIS018-3	6	30	Optimisation in Engineering Applications	Core
CIS015-3	6	30	Social and Professional Project Management	Core
CIS017-3	6	30	Undergraduate Project	Core

### Course-Specific Regulations

N/A

### Additional Course Costs

N/A

### Entry requirements

Standard entry requirements for UK students, students from the European Union and international students.

- Standard entry requirements for UK students – <http://www.beds.ac.uk/howtoapply/ukugentryreqs>
- Students from the European Union - <http://www.beds.ac.uk/howtoapply/eu/guides>

International students - <http://www.beds.ac.uk/howtoapply/international>

### Graduate Impact Statements

The course has been designed to develop graduates who are able to:

- Exhibit an advanced understanding of methods, concepts, techniques, algorithms and technologies within the core area of Computer Systems Engineering and Information Technology such as Electronics, Hardware Engineering, System Modelling and Optimisation Techniques, Software Engineering, Robotics, Sensors, Embedded Systems, Circuit Analysis & Signal Processing and Electronic Systems, Research Methodologies, Computer Programming and Emerging Technologies

- Contribute specialist expertise productively to a multi-specialist development team working from the computer systems software and hardware engineering design, optimisation, implementation and deployment.
- Learn and use, and be able to propose novel computer systems software and hardware engineering ideas and techniques, and develop and follow the trend of the emerging technologies.

### Course Learning Outcomes

Upon successful completion of this course, students should be able to

LO1: Demonstrate advanced knowledge of modern computer systems engineering, digital systems design, coding measurements techniques for specific industry engineering applications.

LO2: Critically evaluate and analyse computer systems engineering problems and evaluate software and hardware solutions.

LO3: Utilising advanced computer programming and digital electronic skills to synthesise solutions of computer systems engineering problems.

LO4: Manage the development of appropriate software and hardware solutions using recognised system engineering processes, including design, analyses, optimisation, implementation, test and documentation.

LO5: Demonstrate comprehensive knowledge and understanding of the complex economic, social, and environmental aspects of computer systems engineering products, services and processes.

LO6: Communicate clearly and logically technical audiences both orally and in writing adapting professional and commercial considerations.

In order to qualify for the award of BEng (Hons) Computer Systems Engineering (with Professional Practice year) students will need to meet all of the outcomes above and:

LO7: Demonstrate knowledge and analytical understanding of professional practice by successfully completing an approved period of approved work place practice.

### PSRB details

This course is accredited by The IET (The Institution of Engineering and Technology) accreditation at level CEng accredited programme. The University of Bedfordshire fully follows the PSRB monitoring procedures. The PSRB QA handbook/procedures are on: <http://www.theiet.org/academics/accreditation/index.cfm>

### Learning and Teaching

The overall teaching and learning methodology is a theoretical exposition accompanied by tutor supported practical activities. This is accomplished by a combination of lectures, tutorials, e-conference discussion and support, directed practical activities in dedicated laboratories.

There are self-directed research and computer based practical activities which can be assisted by the use of teaching packs in various multimedia forms.

The particular form of support is unit specific. However, all are characterised by tutor support and practical activities.

All teaching resources are available in a website – a virtual learning environment that includes references and links, general course and unit information, discussion groups, tests and assessments. This VLE is available off site to enrolled students.

Students entering upon the course should already have good experience of using computers and their operation. Therefore the approach to teaching and learning begins with student centred methods and progresses towards independent learning.

Our teaching is centred upon students, aiming to build their confidence by providing timely and informative feedback under the guidance of their teacher.

Students will gain foundation knowledge in electrical/electronic engineering in their first year study in this course. They will focus on the application of computer techniques to engineering domain in depth whilst broadening their knowledge in the second and the third years of this course. In addition, with their final year projects, students should be able to demonstrate in depth various skills including project management and the production of artefact.

Project supervision involves regular tutorial meetings between group/individuals and their staff supervisor. The project is seen as an essential part to guarantee the standard of a Honours degree, and is seen both within and outside the University as an indication of the overall abilities and performance of the student.

### **Assessment**

The assessments are designed to assist students in meeting the required learning outcomes and their own learning needs in relation to each unit.

The assessments provide students with opportunities to diagnose their skills, abilities, academic/occupational background and level to give students an early indication of what specific learning practices may help them more in some particular areas of study, starting from student induction period in conjunction with Fundamentals of Computing unit and throughout the entire in-course period of study. There will be frequent opportunities to get feedback both from tutors, peers and via self assessment, and some assessments will allow for draft submissions to be considered by a tutor or peers to identify aspects in need of development prior to final hand-in.

The assessments are to be inclusive such that a variety of methods will be used in assessing students to ensure that no particular group of students are advantaged or disadvantaged. The methods include portfolios, laboratory practical work, group and individual production projects, individual and group written reports and formal written exams.

Mini-projects and case studies provide students with real-world problems. The students are expected to find solutions to the problems following the process of analysis, technique evaluation, design and syntheses, and solution evaluation.

These min-projects and case studies are designed in both group work and individual work fashions to allow student to practice their communication skills and team working skills, and to develop their capability of working individually. They are also design in the way in which students need to connect together different elements taught within a unit and also across different units with helps from the course team who explain to students how individual units make up of the course.

Written exams focus on theoretical knowledge and the application of the knowledge to engineering problems.

**Assessment Map**

Unit Code	C / O	Trimester 1 (Oct)												Trimester 2 (Feb)											
		4	5	6	7	8	9	10	11	12	13	14	15	5	6	7	8	9	10	11	12	13	14	15	
CIS038-1	C														WR-I								EX		
CIS018-1	C								CW-Port				Ex-CB												
CIS020-1	C			CW-ePort									WR-Gr												
CIS034-1	C																WR-Gr						EX		
CIS047-2	C								CW-Port				EX												
CIS016-2	C					WR-I							EX												
CIS006-2	C														WR-I							WR-I			
CIS048-2	C																		CW-Port			EX			
CIS097-2	O	Year Long work placement																							
CIS013-3	C	CW-RW											WR-I												
CIS018-3	C					CW-Port							EX												
CIS015-3	C																	PR-Oral		WR-I			EX-CB		
CIS017-3	C															WR-I						PR-viva			

### **Developing your employability**

Employability is understood widely as encompassing knowledge, skills and a professional attitude which your tutors expect you to display in all your units. All University of Bedfordshire courses aim to help you to be prepared for the world of work. The Careers Service is there to support you throughout the three years of your study. Our curriculum gives you skills that are valuable for a career within Computer Science but it is also relevant for a much wider range of applications.

The final year unit 'Social and Professional Project Management' in particular requires you to work in a team so as to apply a current project management methodology that embraces all of these knowledge areas in an integrated way while going through the stages of planning, execution and project control; you will work as part of a team, take responsibility and make autonomous decisions that impact on the project team performance.

In addition and somewhat complementary the honours project fosters independent and autonomous study: you learn to take up the responsibility of conducting your project, typically derived from your own ideas, in collaboration with a dedicated member of the teaching staff as project supervisor.

Students who register for the degree with professional practice year will additionally attend a series of workshops and activities related to securing a suitable placement and compulsory briefings at the end of year 2 to ensure that all legal requirements for health and safety, safeguarding etc. training have been met,. This will be explained more fully in your professional practice handbook once you have registered with the Careers and Employability Service's Student Development and Awards Team in your first year. If you will be working with children and/or vulnerable people you will be required to have a DBS check and undertake Safeguarding and Prevent training.

### **External Speakers/Visits**

At least two invited visits/speakers from industry or from academic research institutions will be invited to deliver a talk and share their experience with the students in order to enhance their employability opportunities in the area of computer systems engineering.

### **After Graduation**

Graduates of this degree will be able to embark on a graduate career within electronics, telecommunications, networking and IT industries. The theoretical foundations taught in the course will enable you to continue your studies and register on taught or research based Masters courses such as MSc Embedded Systems, MSc Electronic Engineering, MSc Telecommunications Management, MSc Mobile Computing, MSc Computer Security and Forensics, as well as MSc by research and PhD programmes. Students can also continue onto PhDs by research which can lead to a career in higher education.

### **Additional Information**

This course is central to the portfolio of courses within the Department of Computer Science and Technologies. Students have the opportunity to expand their knowledge by interaction with their peers in cognate courses that specialise in areas such as Electronics, Hardware Engineering, Modelling, Software Engineering, Robotics, Sensors, Embedded Systems, Circuit Analysis & Signal Processing and Electronic Systems and Computer Networks. The Department creates numerous interfaces where this interaction can happen.

### **Student Support during the course**

At institutional level, the university has in place a range of easily accessible support structures for new and existing students.

The Student Information Desk (SiD, <http://beds.ac.uk/sid>) offers confidential advice on all aspects of academic study. It provides information about other areas of university-wide student support such as extenuating circumstances, housing, health, counselling, study support, special needs and disability advice, and careers service. The Study Hub provides workshops and one to one support for academic skills.

The university chaplaincy runs regular meetings, social events and trips. The Student Union provides additional support and activities.

Course specific support is also in place. First year students receive a comprehensive induction in the week prior to the commencement of the academic year. In addition to this, course co-ordinators will meet with their student groups to explain the course structure and other issues relating to the student experience. These introductions will give you outlines of your course and units, a description of the ways you will be encouraged to develop your knowledge and skills, and signpost resources and materials to assist the process of your learning and success. An important part of this induction is the training to use BREO (Bedfordshire Resources for Education Online). BREO is your personalized virtual learning environment that contains lecture notes, links for online assignment submissions, staff contact details, links to central student services and much more. We expect that you use BREO regularly, and that you use your university email where we send you updates about all aspects of your course which need your attention.

All students will be allocated a personal tutor when they join the course. This academic will be responsible of monitoring your academic progress throughout your first year and beyond, and will help you with any academic or personal issues that might come up. The personal tutor is your consistent point of contact for support and guidance, but will on occasion refer you to other university staff for specific issues.

Further support is provided by lecturers who have office hours and by the course administration team. Students may be required, at the discretion of the course coordinator, to undergo diagnostic testing for academic English language abilities, and may further be required, at the course coordinator's discretion, to participate in academic English support workshops or classes laid on by the University.

Our PAL (Peer Assisted Learning) scheme will provide additional support to new students from students at levels 5 and 6.

#### Additional Course costs

N/A

#### Course Equality Impact Assessment

Question	Y/N	Anticipatory adjustments/actions
The promotion of the course is open and inclusive in terms of language, images and location?	Y	
Are there any aspects of the curriculum that might present difficulties for disabled students? For example, skills and practical tests, use of equipment, use of e-learning, placements, field trips etc.	N	If so indicate the anticipatory adjustments and arrangements here
Are there any elements of the content of the course that might have an adverse impact on any of the other groups with protected characteristics <sup>1</sup> ?	N	If so then indicate the anticipatory adjustments and arrangements here
If the admission process involves interviews, performances or portfolios indicate how you demonstrate fairness and avoid practices that could lead to unlawful discrimination?	Y	The interview process would involve various admission and academic staff that would fully follow University admission professional procedures and fairness, and

<sup>1</sup> Age, Gender reassignment, Marriage and civil partnership, Pregnancy and maternity, Race, Religion and belief, Sex, Sexual orientation



		avoid any possible discrimination.
Confirm that you have considered that the course learning outcomes and Graduate Impact Statements are framed in a non-discriminatory way.	Y	University of Bedfordshire professional practice will ensure that no-one is either directly or indirectly treated less favourably than others.
Confirm that the course handbook makes appropriate reference to the support of disabled students.	Y	

<b>Administrative Information – Faculty completion</b>	
<b>Faculty</b>	Creative Technologies and Science
<b>Portfolio</b>	Undergraduate Computer Science and Technology
<b>Department/School</b>	Computer Science and Technology
<b>Course Coordinator</b>	Dr Shyqyri Haxha
<b>Trimester pattern of operation</b>	October (Semester 1), February (Semester 2)
<b>PSRB renewal date (where recognised)</b>	2019
<b>Version number</b>	1/17
<b>Approved by (c.f. Quality Handbook ch.2)</b>	Periodic Review Panel
<b>Date of approval (dd/mm/yyyy)</b>	10/02/2017
<b>Implementation start-date of this version (plus any identified end-date)</b>	October 2017
<b>Study model type (e.g. study centre)</b>	Full-time

Form completed by:

Name: ...Dr Shyqyri Haxha ..... Date: .....21/05/2017....

Authorisation on behalf of the Faculty Teaching Quality and Standards Committee (FTQSC)

Chair: ..... Date: .....

<b>Course Updates</b>		
<b>Date (dd/mm/yyyy)</b>	<b>Nature of Update</b>	<b>FTQSC Minute Ref:</b>


<b>Administrative Information – Academic Registry completion</b>	
<b>Route code (post approval)</b>	
<b>JACS / HECoS code (KIS)</b>	
<b>SLC code (post approval)</b>	
<b>Qualification aim (based on HESA coding framework)</b>	



### Annexes to the Course Information Form

*These annexes will be used as part of the approval and review process and **peer academics** are the target audience.*

#### General course information

<b>Course Title</b>	Computer Systems Engineering Computer Systems Engineering (with Professional Practice Year)
<b>Qualification</b>	BEng (Hons)
<b>Route Code (SITS)</b>	BECSEADF+BECEPAAF
<b>Faculty</b>	Creative Technologies and Science
<b>Department/School/Division</b>	Computer Science and Technology
<b>Version Number</b>	1/19

### Annex A: Course mapping of unit learning outcomes to course learning outcomes

Unit code	CIS038-1	CIS018-1	CIS020-1	CIS034-1	CIS006-2	CIS016-2	CIS047-2	CIS048-2	CIS097-2	CIS013-3	CIS018-3	CIS015-3	CIS017-3
Level	4	4	4	4	5	5	5	5	5	6	6	6	6
Credits	30	30	30	30	30	30	30	30	30	30	30	30	30
Core or option	Core	Core	Core	Core	Core	Core	Core	Core	Optional	Core	Core	Core	Core
Course Learning Outcome (number)	<i>Insert LO1 and/or LO2 for each unit into cell corresponding to the course learning outcome</i>												
1	LO1	LO1	LO1	LO1	LO1	LO1	LO1	LO1		LO1	LO1	LO1	LO1
2	LO2	LO2			LO4						LO2		
3			LO2		LO2		LO2	LO2			LO1		LO2
4	LO1	LO1		LO1		LO2		LO1			LO1	LO2	LO2
5	LO1	LO2		LO2	LO1		LO1				LO1		
6					LO1	LO2	LO1			LO1			LO1
7	LO2		LO2	LO1	LO2, LO4	LO1	LO2	LO1		LO2	LO2	LO2	LO1

**Annex B: Named exit or target intermediate qualifications**

*This annex should be used when Schools wish to offer intermediate qualifications which sit under the main course qualification as named exit or target awards, rather than unnamed exit/default awards.*

**Section 1: General course information**

<b>Intermediate Qualification(s) and titles</b>	<p><i>Specify the intermediate qualifications which are named exit or target qualifications (award types) AND what the qualification titles will be, as stated in the course information section of the associated CIF</i></p> <p><i>It is not necessary for the intermediate qualifications to have the same titles as the overall award, but the title must reflect the units taken to achieve it.</i></p>
<b>Mode(s) of Study and Duration</b>	<i>Indicate whether each intermediate qualification will be offered full time, part time or both, and the standard amount of time a student will take to complete each target qualification.</i>
<b>Type of Intermediate Qualification(s)</b>	<p><i>State whether the intermediate qualifications are named exit and/or target awards.</i></p> <p><i>Students register for target awards at the commencement of their study. Named exit awards provide an opportunity to gain a named qualification when a student fails to complete the main qualification for which they were registered or because they do not achieve the requirements of their original main qualification.</i></p>
<b>Route Code(s) (SITS) of Intermediate Qualification(s)</b>	

**Section 2: Qualification unit diet**

*One table to be used for each intermediate qualification*

<b>Confirmation of unit diet for:</b>	<i>Insert intermediate qualification and title</i>	
The units to achieve the credits required may be taken from any on the overall diet for the main course qualification		<input type="checkbox"/>
A combination of units from a restricted list must be taken to achieve the credits required (specify the list below)		<input type="checkbox"/>
A specific set of units must be taken to achieve the credits required (specify units below)		<input type="checkbox"/>

List of units (if applicable):-

**Section 3: Course structure and learning outcomes**

*One table to be used for each intermediate qualification*

<b>Intermediate qualification and title</b>												
The Units which make up this course are:					<b>Contributing towards the learning outcomes</b> <i>Insert LO1 and/or LO2 for each unit into cell corresponding to the course learning outcome</i>							
Unit Code	Level	Credits	Unit Name	Core or option	1	2	3	4	5	6	7	

### Annex C: Course mapping to FHEQ level descriptor, subject benchmark(s) and professional body or other external reference points

One set of mapping tables to be produced for the course and each named intermediate qualification

<b>Course (or intermediate) qualification and title</b>	Computer Systems Engineering Computer Systems Engineering (with Professional Practice Year)
---	--

FHEQ Descriptor for a higher education qualification	QAA FHEQ level descriptors; October 2014	Course Learning Outcome(s)						
		1	2	3	4	5	6	7
i. A systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of a discipline.				X	X			
ii. An ability to deploy accurately established techniques of analysis and enquiry within a discipline		X		X				
iii. Conceptual understanding that enables the student: <ul style="list-style-type: none"> <li>- to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline</li> <li>- to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline</li> </ul>		X		X				X
iv. An appreciation of the uncertainty, ambiguity and limits of knowledge					X	X		
v. The ability to manage their own learning, and to make use of scholarly reviews and primary sources (for example, refereed research articles and/or original materials appropriate to the discipline).		X					X	
vi. Typically, holders of the qualification will be able to apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects			X					
vii. Typically, holders of the qualification will be able to critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgements, and to frame appropriate questions to achieve a solution - or identify a range of solutions - to a problem			X			X		X
viii. Typically, holders of the qualification will be able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.				X			X	
ix. And holders will have the qualities and transferable skills necessary for employment requiring the exercise of initiative and personal responsibility; decision-making in complex and unpredictable			X				X	

contexts; the learning ability needed to undertake appropriate further training of a professional or equivalent nature.							
---	--	--	--	--	--	--	--

<b>Subject Benchmark Statement(s)</b>	<i>QAA Subject Benchmark Statement: Engineering, Feb 2015 QAA FHEQ Level descriptors (QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland, August 2008)</i>	<b>Evidence and/or Course Learning Outcome(s)</b> <i>How the course takes account of relevant subject benchmark statements</i>
I. be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality		LO1,LO2,LO4,
II. seek to achieve sustainable solutions to problems and have strategies for being creative, innovative and overcoming difficulties by employing their skills, knowledge and understanding in a flexible manner		LO1,LO4,LO5
III. be skilled at solving problems by applying their numerical, computational, analytical and technical skills, using appropriate tools		LO1, LO3,LO4
IV. be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional responsibilities		LO4, LO5
V. be familiar with the nature of business and enterprise in the creation of economic and social value		LO1,LO5,LO6
VI. appreciate the global dimensions of engineering, commerce and communication		LO4,LO7,LO5
VII. be able to formulate and operate within appropriate codes of conduct, when faced with an ethical issue		LO4,LO5
VIII. be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.		LO5, LO6,LO7

The format of the following mapping tables may be adjusted.

<b>Qualification Characteristic</b>	<i>(insert title and year where appropriate)</i>	<b>Evidence</b> <i>How the course takes account of relevant qualification characteristics documents</i>




<b>Professional body or other external reference points</b>	<i>(insert title and year)</i>	<b>Evidence</b> <i>How the course takes account of Professional body or other external reference points</i>