

Programme Specification

BSc (Hons) Software Engineering

Valid from: September 2012

Faculty of Technology, Design and Environment

SECTION 1: GENERAL INFORMATION

Awarding body:	Oxford Brookes University
Teaching institution and location:	Oxford Brookes University
Final award:	BSc (Hons)
Programme title:	Software Engineering
Interim exit awards and award titles:	CertHE, DipHE, BSc
Brookes course code:	SH
UCAS/UKPASS code:	G600
JACS code:	G600
Mode of delivery:	Face to face
Mode/s of study:	Full-time and Part-time
Language of study:	English
Relevant QAA subject benchmark statement/s:	Computing (2007)
External accreditation/recognition: <i>(applicable to programmes with professional body approval)</i>	
Faculty managing the programme:	Technology, Design and Environment (TDE)
Date of production (or most recent revision) of specification:	March 2012

SECTION 2: OVERVIEW AND PROGRAMME AIMS

2.1 Rationale for/distinctiveness of the programme

The single honours Software Engineering degree course is long established and is designed to teach a professional approach to the entire process of developing software, from the initial gathering of requirements, through the design of the functionality and human interface, to the implementation of the final product. The methods through which this is achieved are independent of the application of the software product, which could be anything from a mobile phone application to a flight simulator. The degree programme includes an optional one year work placement in order to allow students to develop the maturity they will need to become a professional software engineer.

The design of our programmes is informed by state-of-the-art research being undertaken in the department. For example, Prof. Hong Zhu and Dr Ian Bayley, are internationally renowned academics, outstanding in the fields of design patterns, requirements engineering and software testing.

2.2 Aim/s of the programme

The programme is designed to produce successful software engineers who will have an understanding of engineering principles and their application, design skills, knowledge of good management practice, computing science and mathematical formalism.

The course is structured to provide a coherent programme of study in software engineering, which will enable students to adopt a critical and independent approach to learning and to develop the skills, knowledge and understanding necessary to pursue careers in related areas. The theoretical components will have been examined and the coursework will have given the students the opportunity to demonstrate competence in the practical application of the theoretical principles taught. The final year project will have provided an opportunity to put into practice the range of theory and practical skills that have been acquired by the creation of a substantial software artefact.

SECTION 3: PROGRAMME LEARNING OUTCOMES

On completion of the programme students will be able to:

3.1 Academic literacy

A1	Contribute to the creation of new software artefacts by applying the key concepts and ways of working derived from a deep understanding of the fundamental principles of Software Engineering as informed by an operational context.
A2	Incorporate risk management and an understanding of information security issues in the design, development, maintenance and use of information systems.
A3	Apply formal methods, finite state machines and other theoretical aspects of computer science to the analysis, construction and evaluation of software artefacts
A4	Create abstractions from observed patterns encountered across the whole spectrum of real world problem domains to facilitate the analysis and synthesis of relevant solutions

3.2 Research literacy

B1	Apply the scientific method and report findings using accepted formalisms.
B2	Identify and utilise trustworthy information sources, such as the ACM Digital Library to develop a coherent understanding of issues in the domain.
B3	Apply appropriate empirical methods, such as software metrics, to study the creation and use of software systems.

3.3 Critical self-awareness and personal literacy

C1	Evaluate and reflect on the evolution of their strengths and weaknesses across the range of subject based competences involved in their chosen domain through the creation and implementation of a discipline based personal development plan.
C2	Apply self-awareness in evaluating their impact in team based work and utilise appropriate communication and problem resolution strategies.

3.4 Digital and information literacy

D1	Use appropriate technologies such as online libraries and databases to find, critically evaluate and utilise both non specialist (e.g. reports) and technical (e.g. APIs and RFCs) information
D2	Demonstrate proficiency in a range of formal and informal modes of communication such as giving presentations to groups, writing reports and writing software documentation.

3.5 Global citizenship

E1	Demonstrate an awareness of, and work in a manner guided by, the legal, professional, ethical and social issues relevant to the IT and telecommunications industry.
E2	Evaluate the impact of the development, use and maintenance of information systems in commercial, economic and social contexts in both national and international settings.

SECTION 4: PROGRAMME STRUCTURE AND CURRICULUM

4.1 Programme structure and requirements:

The following modules are acceptable for the subject. Students must pass all modules marked 'Compulsory'; at least one module from those marked 'Alternative Compulsory'; as well as meeting the usual university rules for undergraduate programmes.

LEVEL: 4					
Module code	Module Title	Credits	Status	Semester of delivery	Pre-requisites
U08007	Business Computing	30	Compulsory	1 and 2	
U08008	Modern Computing Technology	30	Compulsory	1	
U08009	Introduction to Object Oriented Programming	15	Compulsory	2	U08008
U08606	Discrete Mathematics	15	Compulsory	2	
U08010	Software Development Environments	15	Optional	1	
U08011	Networking and Multimedia	15	Compulsory	2	

LEVEL: 5					
Module code	Module Title	Credits	Status	Semester of delivery	Pre-requisites
U08055	Professional Issues and Computer Risks	15	Compulsory	1	U08007 or U08008
U08025	Foundations of Computation	15	Compulsory	1	U08009, U08606
U08026	Further Object Oriented Programming	15	Compulsory	1	U00009
U08027	Current Research	15	Compulsory	2	U08007, U08008
U08226	Foundations of Security	15	Compulsory	2	U08009
U08223	Data Structures	15	Compulsory	2	U08026
U08048	Requirement Specification and Software Design	15	Compulsory	2	U08007
U08028	Software Development with C and C++	15	Optional	1	U08009
U08054	Web Technology	15	Optional	1	U08008
U08049	Complex and Structured Data	15	Optional	1	U08009
U08038	The Human Computer Interface	15	Compulsory	2	U08009
U08225	Foundations of Operating Systems	15	Optional	1	U08028
U08868	Independent Study level 5	15	Optional	1 or 2	U08007, U08009
U08065	Work Experience Placement	0	Optional	1 and 2	U08055

LEVEL: 6

Module code	Module Title	Credits	Status	Semester of delivery	Pre-requisites
U08096	Project	30	Compulsory	1 and 2	U08055
U08186	Advanced Object Oriented Programming	15	Alternative Compulsory	1	U08223
U08073	Advanced Web Technology	15	Optional	2	U08054
U08074	Reasoning about Functional Programs	15	Optional	2	U08025
U08072	Software Analysis and Testing	15	Compulsory	1	U08048
U08784	Software Project Management	15	Compulsory	2	U08048
U08282	Algorithms and Advanced Data Structures	15	Alternative Compulsory	1	U08223
U08079	Optimised Programming	15	Optional	2	U08223, U08028
U08088	Independent Study level 6	15	Optional	1 or 2	U08007, U08009

4.2 Professional requirements

Currently none.

SECTION 5: PROGRAMME DELIVERY

5.1 Teaching, Learning and Assessment

Students will attend lectures to acquire the knowledge and understanding of the key concepts in both networking and computing modules.

Practical elements of the course will enable students to practice essential skills in a variety of contexts, and build a wide set of experiences on which to reflect and develop professional expertise. For more technical skills, including programming, the practical elements will be based around laboratory classes, allowing students to experiment with the technology in a controlled environment. Dependent on the choice of modules, it is likely that a larger proportion of the assessment for these types of modules will be coursework.

Several modules will include an element of team working, enabling students to collaborate with their peers, developing an awareness of their own abilities as reflected by feedback from others. Team work will also be used to assess the students' acquisition of personal and inter-personal skills, so important for this degree, and equally important for most career paths in the industry.

Academic literacy will be assessed through a mixture of examination and coursework, testing the students' ability to explain key concepts, and to apply them to practical problem solving. This academic knowledge will be developed through all three years of the degree programme, with foundation material assumed and assessed through the prerequisite structure.

Research literacy is primarily assessed in the compulsory dissertation module, but students will have learned and practised these skills in a number of earlier, core modules.

Self-awareness and personal literacy will be supported through the ongoing use of a Professional Development Plan (PDP). This will form a part of the students' induction to the degree, and will be maintained throughout their time at Oxford Brookes, culminating in a pre-career reflection, assessed as part of their dissertation.

Digital and information literacy is fundamental to the academic content of this degree, and will be a distinguishing feature of graduates from the programme. In particular, the use of software tools for system development will be taught and assessed throughout many of the modules, and part of the assessment for these modules will be based on the student's ability to locate, read, and evaluate appropriate documentation for software tools, as well as their ability to document their own software and system artefacts.

Effective and innovative use of ICT is also a key part of the department's strategy. The department uses a variety of VLE's (tailored to what is being taught) and makes extensive use of ebooks, online videos, podcasts and other electronic resources. The department has also developed ICT systems to help delivery of teaching (e.g. web accessible virtual machines, XML & SVG based teaching documentation that can be easily transformed for a variety of accessible media), learning (e.g. twitter to encourage group working, survey monkey feedback by students at the end of each lecture on the module to gauge student comprehension) and assessment (e.g. systems for automating feedback).

Graduates from this programme will develop a career in a world that is increasingly dependent on information technology, and in which major social, political and economic endeavours are enabled by the technology. Students will develop an awareness of their global citizenship through the core modules of the programme, especially those emphasizing the evolution of modern computing technology, and current research directions.

Core modules provide a balance of assessments, appropriate to the learning outcomes of the programme. In particular, early core modules are assessed on the basis of key technical, professional and learning skills, most likely to enable and enhance a student's aptitude for life-long learning. As students master core skills, the issues associated with quality products and processes will play an increasingly important part of the module content. Assessment tasks will be specified in the context of the importance of quality assurance in the IT and telecommunications industry, and criteria for success in assessments will mirror those needed in the work place.

By paying due regard to the Oxford Brookes University Assessment Compact, the assessments on this programme have been designed to develop learning of technical skills, shaped by the underlying theory, and requirements of the industry. Assessment does not present students with a set of hurdles, but rather guides them through the staged acquisition of a complex set of professional skills, so that, by the time they graduate, they are ready to play an effective role in their chosen career. Feedback on the assessment tasks will be provided in a timely manner, emphasizing achievement of the learning outcomes of the modules and the programme. Students will be encouraged to relate the assessment tasks with professional activities, and to relate their achievements with professional standards. Where appropriate, self- and peer- assessment will be used to encourage students to involve themselves in their own professional development.

The department is committed to inclusivity and diversity in its teaching. By the very nature of the discipline, virtually all of our teaching material is available in an accessible format and where possible we follow best practice guidelines and make our electronic material available before the lectures. We also use electronic references and ebooks to further enhance accessibility. Inclusivity and diversity is also embedded in what we teach. As such all new students have a lecture on inclusivity and diversity as part of their induction and important inclusivity and diversity topics such as the need for accessibility and internationalization and how to achieve them are taught on a variety of modules throughout the degree.

5.2 Assessment regulations

The programme conforms to the University Regulations of the University's Undergraduate Framework.

SECTION 6: ADMISSIONS

6.1 Entry criteria

Typical offers

- A-level: BBC or equivalent, preferably including science subjects
- IB Diploma: 30 points, preferably including science
- Advanced Diploma: grade B including A-level grade C, preferably in a science subject and excluding General Studies
- BTEC National Diploma with a DDM profile, preferably in a science subject.

Specific entry requirements

- GCSE: Mathematics at grade B minimum, and English Language at grade C minimum.

Students for whom English is not their main language also need to show that their English is at a high enough level to succeed in their studies. The minimum English language requirements are specified at <http://www.brookes.ac.uk/international/apply/undergraduate/requirements>. See also <http://www.brookes.ac.uk/international/apply/english/>.

6.2 CRB checks

Not normally required

SECTION 7: STUDENT SUPPORT AND GUIDANCE

Support and guidance is available to students throughout the programme, starting from when they first arrive before the course begins.

During induction week, students are given handbooks and other documentation explaining the choices available to them on the programme, and how the systems at Oxford Brookes work. The Programme Lead, Subject Coordinators and Academic Advisors are available for consultation as are the Student Support Coordinators (SSCs).

Throughout the programme, module and dissertation handbooks alongside online resources available through the virtual learning environment provide a great deal of guidance for students. In addition, they can get help and guidance from their Programme Lead, Subject Coordinator, Academic Adviser (for first years) and the department's Student Support Coordinators. They can also get module specific advice from the Module Leader and any of the staff teaching on the relevant module.

At the University level, there are dedicated support services both for specific groups of students such as Oxford Brookes International and the Disability Advisory Service and for all students such as Upgrade - our study skills development/support service. A full range of support services is offered to students seeking graduate roles, and to those looking for placements. Support includes placement officers, career advisers and counsellors, and all students are strongly encouraged to take advantage of these opportunities.

Each programme has at least one student representative. These are voted into position by the students on the programme and provide a mechanism for issues and concerns to be fed back through the

department's committee structure. Student representatives sit on departmental committees concerned with programme management and course development and also attend monthly student forums which are meetings specifically for the representatives to bring forward student concerns.

SECTION 8: GRADUATE EMPLOYABILITY

Graduates from the programme will be ideally equipped for a career in the computing industry. Graduates are employed across a whole range of careers from development roles in small software houses, to the activities of IT departments in large, multinational corporations, to more specialist roles for providers of IT and telecommunications services. These include technical development roles, including software design and development, specialist product support, and infrastructure and security management roles.

According to research conducted by e-skills UK, the National Sector Skills Council for IT and Telecommunications, the IT professional workforce in the UK, has almost doubled since 1994, and is likely to continue growing at 5-8 times the average employment growth for the coming decade. Recent graduates from this programme have been employed by, for example, Sophos, Logica, Jaguar/Land Rover and IBM. Specific job titles include Software Developer, Threat Researcher, Project Manager, Business Analyst and Web Developer.

SECTION 9: LINKS WITH EMPLOYERS

Many modules use guest speakers from industry to illustrate the practical application of the module material. Potential employers are keen to talk to a more general audience of students, but will discuss the nature of their industry, as well as how the students might contribute. The department is host to at least 12 'Guru' lectures, delivered as part of the BSc in Information Technology Management for Business (ITMB) programme, but open to all students. These are broadcast live at one ITMB university and over the internet by the others, and include Q&A sessions. Topics complement a variety of technical and professional learning outcomes.

All students may take a year out in industry. Employers are keen to promote their companies and the opportunities offered. Even for students who do not take a placement year, this can provide a good insight into the type of jobs available, and the skills employers are looking for. Students who do take a work placement may bring ideas for final year projects back with them, and are noticeably more able to contribute insights into industrial applications to the modules they take in their final year.

The department maintains close links with the university Careers Office. Themed 'mini' careers fairs are organised by this office – with technology being a common theme. Students are encouraged to use the facilities offered, including CV workshops, and practice interviews and assessment-centre activities.

An Industrial Advisory Board is run within the department, with senior employees of regional and representative organisations as members. The board is consulted on major initiatives within the department, including programme revalidations, possible research partnerships, future trends and directions, and the feasibility of new course offerings.

An alumni organisation has recently been formed in the department. The aim is to invite ex-students who are now in a variety of technical and managerial roles, to network with each other, and with our current students. It is anticipated that this organisation will be of great benefit to students starting out on their careers, as well as for more senior alumni looking to exploit the skills and expertise of the staff and students in the department.

Research centres within the department are actively involved with Knowledge Transfer Partnerships, and other links with employer organisations. One of the spin-offs from these activities is the on-campus presence of industrial-based experts in fields closely related to our degree offerings.

SECTION 10: QUALITY MANAGEMENT

Indicators of quality/methods for evaluating the quality of provision

The primary indicators of quality come through regular student feedback, module reviews, external examiners' reports, annual and periodic programme reviews and student surveys. Student feedback on a module is gathered using the standard university feedback form and is summarised by the administration team within the faculty. This summary is incorporated into the module report documentation used to inform the module review at the Subject Committee which is attended by the student representative for the subject. The minutes of the subject committee that summarise the discussion of module reviews are then presented at the Subject Examination Committee meeting where comments are invited from the External Examiners. Any changes to module delivery and/or content which arise out of this review process are communicated to the Subject Committee chair who has the responsibility for ensuring that they are implemented.

Each module is assigned an Internal Moderator who has the responsibility of checking the quality of the examination papers and the coursework specifications before they are sent to the External Examiner for comments. Examination papers and coursework specification may be modified in the light of the External's comments before submission to the University Examination Office. The Internal Moderator also checks the quality of the marking of the assessments on the module based on a randomly selected sample.

The programme as a whole is reviewed annually through the University Annual Review procedure. This review assesses the quality of teaching, learning and assessment and the overall academic standards of the programme. It takes into account student progression and compares the overall performance of students against the University benchmark. The Annual Review considers and responds to the comments from the External Examiners.

Programmes are reviewed normally on a five year periodic cycle in accordance with the provisions of the quality framework set by the University.

The National Student Survey of final year students provides valuable annual feedback on the student experience. The results of the NSS are evaluated at both Department and Faculty level and an action plan is drawn up to ensure that the necessary changes are made to improve the student experience.

Regular Student Forum meetings are held during semester to give the student representatives a forum to present and discuss the concerns of the student body. The forums are attended by senior members of the department.

The Industrial Advisory Board is valuable in involving employers and other stakeholders in the development of the Computing programmes. The Board meet on an annual basis to discuss the research and the teaching that is done in the department. Comments are invited from Board members on the portfolio of programmes and on any new programme developments.