

PROGRAMME SPECIFICATION

for the award of

MSc in Computing Science

Managed by the Faculty of Technology, Design and Environment

delivered by School of Engineering, Computing and Mathematics

Date approved:	Feb 2019
Applies to students commencing study in:	September 2021

RECORD OF UPDATES

Date amended*	Nature of amendment**	Reason for amendment**
July 2016	Transferred to new template	CMA Compliance
October 2016	Checked for errors and amended by Subject Coordinator and Programme Lead.	Subject specialist knowledge.
November 2018	One module replaced	Outdated 20 credit module replaced with the existing two recently developed 10 credit modules.
November 2018	Name change	For marketing purposes
Sep 2020	Coursework exam change	Change to 100% coursework in TECH7004
December 2020	Change of module codes acceptable (same modules but different codes)	Consolidation of module codes
December 2020	Removal of sandwich mode	Consolidation of delivery

SECTION 1: GENERAL INFORMATION

Awarding body:	Oxford Brookes University
Teaching institution and location:	Oxford Brookes University, Wheatley Campus
Language of study:	English
Final award:	MSc, PG Dip, PG Cert
Programme title:	Computing Science
Interim exit awards and award titles available:	Postgraduate Diploma Computing Science Postgraduate Certificate Computing Science Postgraduate Certificate Computing Science Research Project
Brookes course code:	MSC-CSI PGD-CSI PGC-CSI PGC-CSR
UCAS code:	P000779
JACS code:	I100
HECoS code:	100366
Mode of delivery:	Full-time (face to face/on-campus) Part-time (face to face/on-campus)
Mode/s and duration of study:	PG Cert Full time – minimum 1 semester, maximum 5 years PG Cert Part time – minimum 2 semesters, maximum 5 years PG Dip Full Time - minimum 2 semesters, maximum 5 years PG Dip Part Time - minimum 4 semesters, maximum 5 years MSc Full Time - minimum 1 year, maximum 5 years MSc Part Time - minimum 2 years, maximum 5 years
QAA subject benchmark statement/s which apply to the programme:	Master's degrees in computing (2011) http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/QAA386_Computing.pdf
Professional accreditation attached to the programme:	Partial BCS Accreditation for Chartered IT Professional (http://www.bcs.org/category/10972)
University Regulations:	The programme conforms to the University Regulations for the year of entry as published/archived at: http://www.brookes.ac.uk/regulations/

SECTION 2: WHY STUDY THIS PROGRAMME?

Computing is a fast paced and exciting discipline that thrives on innovation and has the potential to change the world. Computer scientists developed the world wide web twenty years ago and nothing has been the same since. Two decades later we are still coming to terms with its potential; recent developments include social media, smartphones and tablet computers. To be an effective practitioner in this area requires the ability to stay up to date with rapidly changing technologies and the competence to apply these technologies effectively.

This course is for graduates from non-computing related disciplines and is aimed at helping students wishing to take advantage of the increasing amount technology impacts on their existing career or who are considering a career change into IT. For this reason, it is particularly aimed at people who wish to undertake a form of Professional Development and in addition to the normal award of MSc, the course is also offered with the awards of Postgraduate Certificate and Postgraduate Diploma for those who wish to learn a particular aspect of the discipline. Students who have previous experience of research and study methods and wish to undertake study which is linked to a particular aspect of their employment also have the opportunity to study for a Postgraduate Certificate Computing Science Research Project.

The design of our programmes is informed by state of the art research being undertaken in the department. Students on our programmes have access to highly specialised computer laboratories where they learn the practical application of cutting edge theoretical skills and techniques.

Students completing the MSc programme will have learned the fundamental principles of computer science such as the theoretical underpinnings of programming and computer systems and have been given numerous opportunities to apply these principles in relevant social and business contexts. 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 dissertation 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.

Students completing the PG Dip programme will have learned the fundamental principles of computer science such as the theoretical underpinnings of programming and computer systems and have been given numerous opportunities to apply these principles in relevant social and business contexts. 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.

Students completing the PG Cert will have learned aspects of software construction and development and demonstrated their ability to create software artefacts. The theoretical components of the programme 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.

SECTION 3: PROGRAMME LEARNING OUTCOMES

On successful completion of the programme, graduates will demonstrate the following Brookes Attributes:

3.1 ACADEMIC LITERACY

A01	Create new software artefacts by applying the key concepts and methodologies derived from an understanding of the fundamental principles of computing.
A02	Analyse and apply the processes and techniques necessary for the management and production of software projects taking into consideration customer requirements, quality assurance, risk assessment and development schedules and costs.
A03	Apply fundamental principles of computer science to the analysis and evaluation of networks and operating systems.
A13	Critically appraise emerging technologies and techniques and identify and assess the potential benefits for future systems.

3.2 RESEARCH LITERACY

R01	Demonstrate self-direction and originality in planning and managing a research project, synthesising relevant research based materials in the organisation of the project
R05	Demonstrate a systematic understanding of knowledge of current problems and/or new insights, much of which is at, or is informed by, the forefront of computer science or relevant area of professional practice

3.3 CRITICAL SELF-AWARENESS AND PERSONAL LITERACY

C01	Evaluate and reflect on the evolution of their strengths and weaknesses across the range of subject based competences involved in the domain.
C02	Participate in and direct group activities and recognise and evaluate the importance of teamwork, time management, initiative, personal responsibility and accountability in delivering successful solutions
C03	Create solutions to problems, acting autonomously and making decisions in challenging situations in planning and implementing tasks and delivering on a given time scale

3.4 DIGITAL AND INFORMATION LITERACY

D01	Identify digital information sources and from which, acquire information for further analysis (e.g. Open linked data, SPARQL endpoints).
D02	Demonstrate effective skills and practices necessary to become a confident, agile adopter of a range of technologies for personal, academic and professional use.
D03	Create a solution to a complex problem using existing appropriate software tools.

3.5 ACTIVE CITIZENSHIP

G01	Identify and analyse risk, reliability, legal, social, environmental, professional and ethical issues relevant to research and problem solving in the domain
G02	Evaluate the impact of the development, use and maintenance of computer and communication systems in economic, political, cultural and social contexts in both national and international settings

SECTION 4: CURRICULUM CONTENT & STRUCTURE

4.1 PROGRAMME STRUCTURE AND REQUIREMENTS:

Requirements for MSc

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
TECH7005	Research, Scholarship Methods and Professional Skills	20	7	Compulsory	100% Coursework
COMP7001	Object Oriented Programming	20	7	Compulsory	100% Coursework
DALT7002	Data Science Foundation	10	7	Compulsory	100% Coursework
DALT7011	Introduction to Machine Learning	10	7	Compulsory	100% Coursework
SOFT7003	Advanced Software Development	20	7	Compulsory	100% Coursework
COMP7002	Modern Computer Systems	20	7	Compulsory	100% Coursework
TECH7004	Cyber Security and the Web	20	7	Compulsory	100% Coursework
TECH7009	MSc Dissertation in Computing subjects	60	7	Compulsory	100% Coursework
TECH7003	Independent Study 2	20	7	Optional	100% Coursework

Requirements for Postgraduate Diploma

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
TECH7005	Research, Scholarship Methods and Professional Skills	20	7	Optional	100% Coursework
COMP7001	Object Oriented Programming	20	7	Optional	100% Coursework
DALT7002	Data Science Foundation	10	7	Optional	100% Coursework
DALT7011	Introduction to Machine Learning	10	7	Optional	100% Coursework
SOFT7003	Advanced Software Development	20	7	Optional	100% Coursework
COMP7002	Modern Computer Systems	20	7	Optional	100% Coursework
TECH7004	Cyber Security and the Web	20	7	Optional	100% Coursework
TECH7009	Dissertation in Computing subjects	60	7	Optional	100% Coursework
TECH7003	Independent Study 2	20	7	Optional	100% Coursework

Requirements for Postgraduate Certificate

Code	Module Title	Credits	Level	Status	Coursework : Exam ratio
TECH7005	Research, Scholarship Methods and Professional	20	7	Optional	100% Coursework

	Skills				
COMP7001	Object Oriented Programming	20	7	Optional	100% Coursework
DALT7002	Data Science Foundation	10	7	Optional	100% Coursework
DALT7011	Introduction to Machine Learning	10	7	Optional	100% Coursework
SOFT7003	Advanced Software Development	20	7	Optional	100% Coursework
COMP7002	Modern Computer Systems	20	7	Optional	100% Coursework
TECH7004	Cyber Security and the Web	20	7	Optional	100% Coursework
TECH7003	Independent Study 2	20	7	Optional	100% Coursework

Requirements for Postgraduate Certificate Computing Science Research Project

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
TECH7009	Dissertation in Computing subjects	60	7	Compulsory	100% Coursework

4.2 PROGRESSION AND AWARD 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 university rules for postgraduate programmes

<https://www.brookes.ac.uk/regulations/current/specific/b4/>

Students studying for an MSc must complete at least 180 credits worth of modules.

Students studying for a Postgraduate Diploma must complete at least 120 credits worth of modules.

Students studying for a Postgraduate Certificate must complete at least 60 credits worth of modules.

Students who choose to progress from a Postgraduate Certificate to a Postgraduate Diploma may be required to take additional credits over the 120 normally required for a Postgraduate Diploma in order to ensure that they have completed all the compulsory modules for the Postgraduate Diploma.

4.3 PROFESSIONAL REQUIREMENTS

Students who pass the MSc will meet the requirements for partial BCS Accreditation for Chartered IT Professional (<http://www.bcs.org/category/10972>).

SECTION 5: TEACHING AND ASSESSMENT

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

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.

Modules have 10 learning hours per module credit. For the 20 credit taught modules, this is 200 learning hours, for the dissertation, this is 600 learning hours. Learning hours are broken down in contact and

non-contact hours. For taught modules this normally consist of 4 hours contact per week, divided into 2 hours of lecture and 2 hours of practical/tutorial work. Exceptions to this are –

- TECH7003/P00014 Independent Study 2 – This module is guided learning and will run in a variety of modes. It is only available to students in exceptional circumstances.
- COMP7001/P00100 Object Oriented Programming – This module is run in apprentice mode where the module is taught in a computer lab in 4 hours per week sessions with the lecture and practical components being interwoven in the 4 hour slot
- SOFT7003/P00404 Advanced Software Development – On this module the students work in software development teams supported by staff. There are 2 hours of lecture for the first 8 weeks. The remaining 32 contact hours are allocated as tutorial and support time as needed by each development team.

Students on the dissertation will arrange supervision sessions with their supervisor(s) as needed. It is expected that each student will contact their supervisor(s) at least once every 2 weeks during the dissertation period.

The mix of coursework to exam will vary depending on the modules chosen and is given for each module in section 4.1. For an MSc this will normally be – dissertation, TECH7005/P00990, SOFT7003/P00404, – 100% coursework; COMP7001/ P00100 40% exam:60% coursework; COMP7002/P00191, TECH7005/P00702 – 50% exam:50% 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. Teamwork 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.

Research literacy is assessed in the Research, Scholarship Methods and Professional Skills module and the dissertation module, but students will have learned and practised these skills in a number of other modules.

Self-awareness and personal literacy will be supported through the on-going use of reflection as an assessed part of coursework. This culminates in a piece of reflection on a major piece of work, 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 active citizenship through the core modules of the programme, especially those emphasizing the evolution of modern computing technology, and current research directions. Active Citizenship includes legal, social, ethical, sustainability and risk

(LSESR) issues. These issues are initially addressed within the Research and Scholarship module in the first semester and then developed and assessed across the programme culminating in the dissertation. The strategy is to include a distinct element in appropriate coursework in which students are asked to critically reflect on these issues in the context of the coursework scenario.

Compulsory 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.

SECTION 6: ADMISSION TO THE PROGRAMME

6.1 ENTRY REQUIREMENTS

The University's standard requirements are

<http://www.brookes.ac.uk/studying-at-brookes/how-to-apply/entry-requirements/postgraduate-courses/>

Typical offers of

- Undergraduate degree: 2:ii in a non computing or IT first degree. Applicants with industrial experience in part of the domain, but no formal qualifications will also be considered.

Specific entry requirements for MSc Computing Science, Postgraduate Diploma Computing Science and Postgraduate Certificate Computing Science

- If the first language is not English evidence is required of a minimum of IELTS score of 6.0 or an equivalent English language qualifications acceptable to the University.

Specific entry requirements for Postgraduate Certificate Computing Science Research Project

- Previous relevant experience in research and study methods at the appropriate level
- If the first language is not English evidence is required of a minimum of IELTS score of 6.0 or an equivalent English language qualifications acceptable to the University.

SECTION 7: PREPARATION FOR EMPLOYMENT

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 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, Project Manager, Business Analyst and Web Developer.

Many modules use guest speakers from industry to illustrate the practical application of the module material. Potential employers are keen to talk to a wider spectrum of students, but will discuss the nature of their industry, as well as how the students might contribute.

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 Liaison 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.