PROGRAMME SPECIFICATION

for the award of

MSc in Advanced Computer Science

Managed by the Faculty of Technology, Design and Environment

delivered by School of Engineering, Computing and Mathematics

Date approved:	February 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 2017	**Change to module list**	**Modules have changed**
December 2018	**Name change**	**To reflect the programme complexity level**
September 2019	**Double coded modules**	**System requirements**
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
Programme title:	Advanced Computer Science
Interim exit awards and award titles available:	Postgraduate Diploma Computer Science Postgraduate Certificate Computer Science Postgraduate Certificate Computer Science, Research Project
Brookes course code:	MSC-ACS
UCAS code:	P008075
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:	BCS accreditation for Chartered IT Professional Further Learning (http://www.bcs.org/category/10972) Partial BCS accreditation for Chartered Engineer (http://www.bcs.org/category/16268)
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?

Computer Science is a fast paced and exciting discipline which 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. Studying Computer Science on our BCS accredited programme equips students with the professional skills, techniques and ways of thinking needed to be able to pursue a successful career. It also underpins this with the theoretical concepts, necessary to give the solid, conceptual foundations, on which to build a lifetime of learning.

In addition to the normal award of MSc, the course is 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, Computer Science Research Project.

The design of our programmes is informed by state of the art research being undertaken in the department. We have colleagues who are internationally renowned academics, outstanding in the fields of design patterns, requirements engineering and software testing.   Students on our programmes have access to highly specialised computer laboratories where they learn the practical application of cutting edge theoretical skills and techniques.

The aim of these programmes is to provide students with the skills, knowledge and understanding necessary to pursue a successful career in various aspects of computer science or to give them the opportunity to refine and extend existing skills. The courses have a strong focus on teaching theoretical concepts and using them to equip the students with the professional and technical skills needed in the workplace.

Students completing the MSc programme will have extended their understanding of the principles of computer science, from the undergraduate level, to be able to deal with more complex, open ended and demanding problems. Students will be given the opportunity to design, implement and evaluate a variety of systems to solve real world problems. These problems will give the students the opportunity to develop skills in managing complex projects. The final dissertation will have provided an opportunity to put into practice the range of theory and practical skills, which have been acquired, by the undertaking of a complex research or technical project.

Students completing the Postgraduate Diploma programme will have extended their understanding of the principles of computer science, from the undergraduate level, to be able to deal with more complex, open ended and demanding problems. Students will be given the opportunity to design, implement and evaluate a variety of systems to solve real world problems. These problems will give the students the opportunity to develop skills in managing complex projects.

Students completing the Postgraduate Certificate programme will have extended their understanding of the principles of computer science, from the undergraduate level, to be able to deal with more complex, open ended and demanding problems. Students will be given the opportunity to design, implement and evaluate a variety of systems to solve real world problems. These problems will give the students the opportunity to develop skills in managing complex projects.

SECTION 3: PROGRAMME LEARNING OUTCOMES

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

3.1 ACADEMIC LITERACY

A13	Critically appraise emerging technologies, and techniques, and identify and assess the potential benefits for future systems.
A20	Create abstractions, from observed patterns encountered across the whole spectrum of real world problem domains, to facilitate the analysis and synthesis of appropriate solutions and to derive suitable meta level patterns.
A21	Critically evaluate the properties of computer systems to create efficient and secure solutions for given real world problems.
A22	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, development schedules and costs.

3.2 RESEARCH LITERACY

R01	Demonstrate self-direction, and originality, in planning and managing a research project and synthesise 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 areas of professional practice.
R07	Understand and participate in the process of peer review and publishing academic work.

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 make 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 the 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 and Professional Skills	20	7	Compulsory	100% Coursework
SOFT7006	Secure Systems Architecture	20	7	Compulsory	50% Coursework:50% Exam
SOFT7003	Advanced Software Development	20	7	Compulsory	100% Coursework
TECH7009	Dissertation in Computing Subjects	60	7	Compulsory	100% Coursework
NETW7013	Enterprise Networking	20	7	Compulsory	35% Coursework: 15% Practical Exam:50% Written Exam
SOFT7010	Data Science and Machine Learning	20	7	Compulsory	100% Coursework
SOFT7011	Big Data and the Cloud	20	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
TECH7009	Research, Scholarship and Professional Skills	20	7	Optional	100% Coursework
SOFT7006	Secure Systems Architecture	20	7	Optional	50% Coursework:50% Exam
SOFT7003	Advanced Software Development	20	7	Optional	100% Coursework
TECH7009	Dissertation in Computing Subjects	60	7	Optional	100% Coursework
TECH7009	Enterprise Networking	20	7	Optional	35% Coursework: 15% Practical Exam:50% Written Exam
SOFT7010	Data Science and Machine Learning	20	7	Optional	100% Coursework
SOFT7011	Big Data and the Cloud	20	7	Optional	100%

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
					100% Coursework
TECH7003	Independent Study 2	20	7	Optional	100% Coursework

Requirements for Postgraduate Certificate:

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
TECH7009	Research, Scholarship and Professional Skills	20	7	Optional	100% Coursework
SOFT7006	Secure Systems Architecture	20	7	Optional	50% Coursework:50% Exam
SOFT7003	Advanced Software Development	20	7	Optional	100% Coursework
TECH700301	Formal Software Engineering	20	7	Optional	50% Coursework:50% Exam
TECH7009	Enterprise Networking	20	7	Optional	35% Coursework: 15% Practical Exam:50% Written Exam
SOFT7010	Data Science and Machine Learning	20	7	Optional	100% Coursework
SOFT7011	Big Data and the Cloud	20	7	Optional	100% Coursework
TECH7003	Independent Study 2	20	7	Optional	100% Coursework

Requirements for Postgraduate Certificate Computer 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.

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 BCS Accreditation for Chartered IT Professional Further Learning (http://www.bcs.org/category/10972) and partial BCS accreditation for Chartered Engineer (http://www.bcs.org/category/16268)

SECTION 5: TEACHING AND ASSESSMENT

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

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. Depending 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, thus 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.

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.
- TECH7005/P00990 Research, Scholarship and Professional Skills – This module has 2-4 hours of lecture per week, plus seminars as needed.
- 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, for the compulsory modules this will be – dissertation,TECH7005/P00990, SOFT7003/P00404 – 100% coursework; SOFT7006/P00410 – 50% coursework:50% exam.

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 primarily assessed in the Research, Scholarship and Professional Skills module, and the dissertation module, but students will have learned and practised these skills in a number of modules.
Self-awareness, and personal literacy, will be supported through the on-going use of reflection, which is assessed in courseworks, and culminates in the assessed reflective component of the 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. 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 with the delivery of teaching (e.g. web accessible virtual machines, XML and SVG based teaching

documentation which can easily be 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.

Compulsory modules provide a balance of assessments appropriate to the learning outcomes of the programme. 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's Assessment Compact, the assessments on this programme have been designed to develop the 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 the 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 e-books 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 programme.

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:-

- **Undergraduate degree:** 2:2 in computing, mathematics, engineering or a science-related subject, in which good programming skills have been developed. Applicants, whose first degree is not in these areas, but who have worked in a related industry, and have obtained good relevant experience and programming skills, can also be considered.

Specific entry requirements for the MSc in Computer Science, Postgraduate Diploma Computer Science and Postgraduate Certificate Computer 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 qualification acceptable to the University.

Specific entry requirements for Postgraduate Certificate, Computer 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 qualification acceptable to the University.

SECTION 7: PREPARATION FOR EMPLOYMENT

Throughout the programme, module and dissertation handbooks alongside online resources, available through the virtual learning environment, provide a great deal of guidance for students on how their studies relate to their future careers. In addition, students can get help and guidance from their Programme Lead, Subject Co-ordinator, the Postgraduate Programme Administrator and the department's Student Support Co-ordinators. 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, the university's study skills development/support service.

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, Threat Researcher, Project Manager, Business Analyst and Web Developer.