Programme Specification: Post Graduate Taught

For students starting in Academic Year 2023/24

1. Course Summary

Names of programme and award title(s)	MSc Computer Science
Award type	Taught Masters
Mode of study	Full-time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 7
Normal length of the programme	1 year
Maximum period of registration	The normal length as specified above plus 3 years
Location of study	Keele Campus
Accreditation (if applicable)	Not applicable
Regulator	Office for Students (OfS)
Tuition Fees	**UK students:** Fee for 2023/24 is £10,000 **International students:** Fee for 2023/24 is £18,800

How this information might change: *Please read the important information at* http://www.keele.ac.uk/student-agreement/. *This explains how and why we may need to make changes to the information provided in this document and to help you understand how we will communicate with you if this happens.*

2. Overview of the Programme

The programme is aimed at enabling graduates from non-computing disciplines to develop an advanced knowledge of underlying principles and concepts of Internet technologies, web-based applications and enterprise and data analytics systems. It will also develop and extend the practical skills that are necessary for the designing, building, deployment and evaluation of distributed information systems and enterprise applications over the Internet.

Graduates from this programme should be able to undertake both development and management roles. The programme recognises the wide variety of potential destinations for students after completion of their programme and as such uses compulsory modules to deliver key skills and enable students to obtain the required knowledge.

3. Aims of the programme

The broad aims of the programme are to enable you to:

- fully participate in the development of modern Internet and Web based systems and to apply an approach to the management and control of such activities;
- acquire research and scholarship skills to undertake independent research and to develop software applications;
- develop critical, analytical and problem based learning skills;

- develop independent active learning;
- develop communication, numeracy, time management, self management and professional development skills;
- develop skills for team working needed in the creation of modern systems.

4. What you will learn

The intended learning outcomes of the programme (what students should know, understand and be able to do at the end of the programme), can be described under the following headings:

- Subject knowledge and understanding
- Subject specific skills
- Key or transferable skills (including employability skills)

Subject knowledge and understanding

Successful students will be able to demonstrate knowledge and understanding of:

- Computational thinking including its relevance to everyday life.
- The scientific method and its applications to problem solving in this area.
- Essential facts, concepts, principles and theories relating to Computing and computer applications as appropriate to the programme of study.
- Modelling: use such knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, prediction and the understanding of trade-offs.
- Requirements, practical constraints and computer-based systems (and this includes computer systems, information security, embedded, and distributed systems) in their context: recognise and analyse criteria and specifications appropriate to specific problems, and plan strategies for their solutions.
- Critical evaluation and testing: analyse the extent to which a computer-based system meets the criteria defined for its current use and future development.
- Methods and tool: deploy appropriate theory, practices and tools for the specification, design, implementation and evaluation of computer-based systems.
- Professional considerations: recognise the professional, economic, social, environmental, moral and ethical issues involved in the sustainable exploitation of computer technology and be guided by the adoption of appropriate professional, ethical and legal practices.

Subject specific skills

Successful students will be able to:

- Specify, design and construct reliable, secure and usable computer-based systems.
- Evaluate systems in terms of quality attributes and possible trade-offs presented within the given problem.
- Plan and manage projects to deliver computing systems within constraints of requirements, timescale and budget.
- Recognise any risks and safety aspects that may be involved in the deployment of computing systems within a given context.
- Deploy effectively the tools used for the construction and documentation of computer applications, with particular emphasis on understanding the whole process involved in the effective deployment of computers to solve practical problems.
- Critically evaluate and analyse complex problems, including those with incomplete information, and devise appropriate solutions, within the constraints of a budget.
- Demonstrate the ability to critically evaluate the technical, societal and management dimensions of computer systems.
- Demonstrate the knowledge and understanding of advanced aspects of computer systems and their use.
- Demonstrate the mastery of the practical methodology of the relevant area of computing, whether for general application in software development or in specialised applications relating to the storing, processing and communication of information.
- Demonstrate the ability to assess systems (which may include software, devices, people, and so on), to recognise the individual components and to understand their interaction, to improve systems, to replace them and to create them.
- Demonstrate familiarity with relevant codes of ethics and codes of practice, relevant industrial standards and principles underpinning the development of high integrity systems (for safety, security, trust, privacy, and so on), while keeping in focus the benefits of, approaches to and opportunities offered by innovation.
- Demonstrate the ability to critically review the literature, which includes identifying all of the key

developments in a particular area of study, critically analysing them and identifying limitations and avenues for further development or explanation.

Key or transferable skills (including employability skills)

Successful students will have the opportunity to develop:

- A wide range of generic skills to ensure they become effective in the workplace, to the benefit of themselves, their employer and the wider economy.
- Intellectual skills: critical thing; making a case; numeracy and literacy; information literacy. The ability to construct well-argued and grammatically correct documents. The ability to locate and retrieve relevant ideas, and ensure these are correctly and accurately referenced and attributed.
- Self-management: self-awareness and reflection; goal setting and action planning; independence and adaptability; acting on initiative; innovation and creativity. The ability to work unsupervised, plan effectively and meet deadlines, and respond readily to changing situations and priorities.
- Interaction: reflection and communication; the ability to succinctly present rational and reasoned arguments that address a given problem or opportunity, to a range of audiences (orally, electronically or in writing).
- Team working and management: the ability to recognise and make best use of the skills and knowledge of individuals to collaborate. To be able to identify problems and desired outcomes and negotiate to mutually acceptable conclusions. To understand the role of a leader in setting direction and taking responsibility for actions and decisions.
- Contextual awareness: the ability to understand and meet the needs of individuals, business and the community, and to understand how workplaces and organisations are governed.
- Sustainability: recognising factors in environmental and societal contexts relating to the opportunities and challenges created by computing systems across a range of human activities.

Keele Graduate attributes

Engagement with this programme will enable you to develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Our educational programme and learning environment is designed to help you to become a well-rounded graduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in after your studies are completed.

Further information about the Keele Graduate Attributes can be found here: http://www.keele.ac.uk/journey/

5. How is the programme taught?

You will use a variety of learning tools in studying for this course. The principal method for you to acquire knowledge is the use of formal lectures. These are supplemented by smaller group tutorials and practical sessions dependent on the topics being covered in the module. Self-study using material provided and that which you research for yourself will supplement the formal learning opportunities.

Formal lectures and self study materials are used to introduce concepts to the student. The smaller group tutorials and practicals enable both consolidation of this material and an understanding of the practicalities of its application in a modern business environment. The tutorials and practicals achieve this aim by having the students apply the taught concepts to real world problems in a situation where individual progress can be monitored.

Information about the Computer Science staff is available at http://www.keele.ac.uk/scm/staff/

6. Teaching Staff

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard.

Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur.

7. What is the structure of the programme?

The academic year runs from September to September and is divided into three semesters. The number of

weeks of teaching will vary from programme to programme, but you can generally expect to attend scheduled teaching sessions between the end of September and mid-December, and from mid-January to the end of April. Our degree courses are organised into modules. Each module is usually a self-contained unit of study and each is usually assessed separately with the award of credits on the basis of 1 credit = 10 hours of student effort. An outline of the structure of the programme is provided in the tables below.

There are two types of module delivered as part of your programme. They are:

- Compulsory modules - a module that you are required to study on this programme;
- Optional modules - these allow you some limited choice of what to study from a list of modules;

Year	Compulsory	Optional		Electives	
		Min	Max	Min	Max
Level 7	120	60	60	0	0

Module Lists

Level 7

Compulsory modules	Module Code	Credits	Period
System Design & Programming	CSC-40044	15	Semester 1
Fundamentals of Computers and Networks	CSC-40064	15	Semester 1
Advanced Programming in Python	CSC-40068	15	Semester 1
Mathematics for AI and Data Science	CSC-40072	15	Semester 1
Collaborative Application Development	CSC-40038	15	Semester 2
Web Technologies and Security	CSC-40046	15	Semester 2
Data Analytics and Databases	CSC-40054	15	Semester 2
Software Engineering	CSC-40066	15	Semester 2

Optional modules	Module Code	Credits	Period
Industrial Placement	CSC-40035	60	Semester 3
MSc Project	CSC-40040	60	Semester 3

Level 7 Module Rules

Either CSC-40035 or CSC-40040 must be chosen in Semester 3.

January intake

The module names and semesters details for January starters are mentioned in the following table:

CSC-40044 System Design and Programming	Semester 2 (Jan-June)	15	Compulsory
CSC-40072 Mathematics for A.I. and Data Science	Sem 2 (Jan-June)	15	Compulsory
CSC-40046 Web Technologies and Security	Sem 2 (Jan-June)	15	Compulsory
CSC-40066 Software Engineering	Sem 2 (Jan-June)	15	Compulsory
CSC-40054 Data Analytics and Databases	Sem 3 (June-Sept)	15	Compulsory
CSC-40038 Collaborative Application Development	Sem 3 (June-Sept)	15	Compulsory
CSC-40040 MSc Project	Sem 3 - Sem 1	60	Optional
CSC-40035 Industrial Placement	Sem 3 - Sem 1	60	Optional
CSC-40064 Fundamentals of Computers and Networks	Sem 1 (Sept-Jan)	15	Compulsory
CSC-40068 Advanced Programming in Python	Sem 1 (Sept-Jan)	15	Compulsory

Learning Outcomes

The table below sets out what students learn in the programme and the modules in which that learning takes place. Details of how learning outcomes are assessed through these modules can be found in module specifications.

Level 7

Subject Knowledge and Understanding	
Learning Outcome	**Module in which this is delivered**
An ability to evaluate the technical, societal and management dimensions of computer systems.	All modules
A knowledge and understanding of advanced aspects of computer systems and their use.	Web Technologies and Security - CSC-40046 MSc Project - CSC-40040 Industrial Placement - CSC-40035 Fundamentals of Computers and Networks - CSC-40064
A combination of theory and practice, with practice being guided by theoretical considerations.	Fundamentals of Computers and Networks - CSC-40064 System Design & Programming - CSC-40044 Data Analytics and Databases - CSC-40054 MSc Project - CSC-40040 Industrial Placement - CSC-40035 Advanced Programming in Python - CSC-40068 Software Engineering - CSC-40066 Web Technologies and Security - CSC-40046
A strong emphasis on the underlying discipline and/or applications.	Web Technologies and Security - CSC-40046 Software Engineering - CSC-40066 Fundamentals of Computers and Networks - CSC-40064
The mastery of the practical methodology of the relevant area of computing, whether for general application in software development or in specialised applications relating to the storing, processing and communication of information.	Fundamentals of Computers and Networks - CSC-40064 Data Analytics and Databases - CSC-40054 Software Engineering - CSC-40066 Web Technologies and Security - CSC-40046 MSc Project - CSC-40040 Industrial Placement - CSC-40035
An understanding of, and attention to, the many and varied aspects of quality.	All modules
An understanding of professional, legal, social, cultural and ethical issues related to computing and an awareness of societal and environmental impact.	Industrial Placement - CSC-40035 MSc Project - CSC-40040

Subject Specific Skills	
Learning Outcome	**Module in which this is delivered**
An ability to engage in a peer review process that involves the critical review of papers, software and proposals, coupled with positive advice for improvement and innovation.	Industrial Placement - CSC-40035 MSc Project - CSC-40040
The ability to assess systems (which may include software, devices, people, and so on), to recognise the individual components and to understand their interaction, to improve systems, to replace them and to create them; this includes socio-technical systems such as those relevant to aspects of healthcare and also computing systems used in specialised applications such as bioinformatics, e-science, virtual environments, financial services, and transport.	All modules
Familiarity with codes of ethics and codes of practice specific to the specialism of the degree programme, relevant industrial standards and principles underpinning the development of high integrity systems (for safety, security, trust, privacy, and so on), while keeping in focus the benefits of, approaches to and opportunities offered by innovation.	All modules
Entrepreneurship, which tends to involve acquiring resources to ensure the success of some technically sound endeavour.	Industrial Placement - CSC-40035 MSc Project - CSC-40040
Communication skills to address effectively technical and non-technical audiences.	All modules

Key or Transferable Skills (graduate attributes)	
Learning Outcome	**Module in which this is delivered**
Ability to set goals and identify resources for the purpose of learning.	Industrial Placement - CSC-40035 MSc Project - CSC-40040
An ability to critically review the literature, which includes identifying all of the key developments in a particular area of study, critically analysing them and identifying limitations and avenues for further development or explanation.	Industrial Placement - CSC-40035 MSc Project - CSC-40040
An ability to recognise and respond to opportunities for innovation.	MSc Project - CSC-40040 Industrial Placement - CSC-40035
Leadership skills, which tend to be characterised by acquiring a vision (based on sound technical insights) coupled with the ability to encourage others to share in that vision and to ensure that this will not be to their detriment.	Industrial Placement - CSC-40035 MSc Project - CSC-40040

8. Final and intermediate awards

Master's Degree	180 credits	You will require at least 150 credits at Level 7
Postgraduate Diploma	120 credits	You will require at least 90 credits at Level 7
Postgraduate Certificate	60 credits	You will require at least 40 credits at Level 7

9. How is the Programme Assessed?

The wide variety of assessment methods used on this programme at Keele reflects the broad range of knowledge and skills that are developed as you progress through the degree programme. Teaching staff pay particular attention to specifying clear assessment criteria and providing timely, regular and constructive feedback that helps to clarify things you did not understand and helps you to improve your performance. The following list is representative of the variety of assessment methods used on your programme:

- **Unseen examinations**: these test a student's knowledge and understanding of computer science topics. Such examinations contain compulsory and possibly also optional questions. Virtually all taught compulsory modules in Semester 1 have unseen examinations as part of the assessment profile.
- **Class tests**: these are taken during the course of a module, usually in a lecture slot. They are intended to assess a student's current understanding and subject knowledge in that module in a structured and focused manner. Some taught compulsory modules may have class tests as part of the assessment profile.
- **Coursework**: normally consists of regular short assignments designed to assess, in more depth than class tests, a student's knowledge and understanding of the course material. Some of these assignments may be computer based; others take the form of individual reports, essays or group projects.
- **Short reports**: for which students are required to write up their own account of small group studies and discussions on particular topics.
- **Tutorial Participation**, whereby students may be asked to make contributions based on the subject material, either orally or as a written solution, sometimes in consultation with their peers.
- **Dissertations** are formal reports of work carried out by students undertaking a project. **Projects** involve the integration and application of theoretical knowledge and problem-solving skills to an identified programming need and/or research problem within the discipline. Dissertations describe product and process in extended detail.
- **Oral presentations and reports** assess a student's ability to communicate their knowledge and understanding, both visually and orally, to both general and academic audiences.

Marks are awarded for summative assessments designed to assess your achievement of learning outcomes. You will also be assessed formatively to enable you to monitor your own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how you can improve the quality of your work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

10. Accreditation

This programme does not have accreditation from an external body.

11. University Regulations

The University Regulations form the framework for learning, teaching and assessment and other aspects of the student experience. Further information about the University Regulations can be found at: http://www.keele.ac.uk/student-agreement/

If this programme has any exemptions, variations or additions to the University Regulations these will be detailed in an Annex at the end of this document titled 'Programme-specific regulations'.

12. What are the typical admission requirements for the Programme?

See the relevant course page on the website for the admission requirements relevant to this programme: https://www.keele.ac.uk/study/

Recognition of Prior Learning (RPL) is considered on a case-by-case basis and those interested should contact the Programme Director. The University's guidelines on this can be found here: http://www.keele.ac.uk/qa/accreditationofpriorlearning/

13. How are students supported on the programme?

Support for student learning and welfare is provided in a number of ways.

- Module leaders and demonstrators are responsible for providing learning support on the individual modules. They also give feedback on all summative and formative assessment, from individual feedback on coursework to more general feedback on examinations.
- The members of academic staff in Computer Science operate an open-door policy whereby lecturers and tutors are happy to see and advise students at any reasonable time or by mutually convenient appointment.
- Every student enrolled on the programme will be allocated an Academic Mentor who is responsible for reviewing and advising on the student's academic progress throughout their time on the programme. Students should approach their Academic Mentor, in the first instance, if they are experiencing issues with any part of the programme.
- Academic Mentors also act as a first point of contact on any non-academic issues that may be affecting their learning and can also refer students to a range of specialist health, welfare and financial services coordinated by Student Services.
- There is an Independent Support Tutor who is independent of the lecturing team delivering the modules for the programme and available to all students on the programme. The role of the Independent Support Tutor is to provide general support for students, though they will deal specifically with attendance monitoring and the exceptional circumstances procedure.

14. Learning Resources

- There is a specialist teaching laboratory and associated workroom with equivalent configuration of machines, both of which are reserved for access by those studying postgraduate taught courses in the School. All the systems available have software appropriate to the modules included in this course, in addition to those provided as standard by the University.
- The relevant Course Handbook will provide you with key information and guidance on structure, content and assessment.
- You may contact the Course Director and the MSc Administrator, or their substitutes, via e-mail at all times on weekdays and you may expect a response to your communications within 3 working days.
- You will have access to the Course Director and tutors by appointment.
- You will have access to material in the programme's online learning resources.
- You will have access to Keele's Library Information Services on campus and via the Internet.

15. Other Learning Opportunities

Individual taught modules can be accessed as CPD (Continuing Professional Development) modules. These modules are open to people to attend who are not members of the student cohort studying on the programme.

16. Additional Costs

As to be expected there will be additional costs for inter-library loans and potential overdue library fines, print and graduation. We do not anticipate any further costs for this programme.

17. Quality management and enhancement

The quality and standards of learning in this programme are subject to a continuous process of monitoring, review and enhancement.

- The School Education Committee is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the programme as a whole are reviewed and enhanced every year in the annual programme review which takes place at the end of the academic year.
- The programmes are run in accordance with the University's Quality Assurance procedures and are subject to periodic reviews under the Revalidation process.

Student evaluation of, and feedback on, the quality of learning on every module takes place every year using a variety of different methods:

- The results of student evaluations of all modules are reported to module leaders and reviewed by the Programme Committee as part of annual programme review.
- Findings related to the programme from the annual Postgraduate Taught Experience Survey (PTES), and from regular surveys of the student experience conducted by the University, are subjected to careful analysis and a planned response at programme and School level.
- Feedback received from representatives of students on the programme is considered and acted on at regular meetings of the Student Staff Voice Committee.

The University appoints senior members of academic staff from other universities to act as external

examiners on all programmes. They are responsible for:

- Approving examination questions
- Confirming all marks which contribute to a student's degree
- Reviewing and giving advice on the structure and content of the programme and assessment procedures

Information about current external examiner(s) can be found here:
http://www.keele.ac.uk/qa/externalexaminers/currentexternalexaminers/

18. The principles of programme design

The programme described in this document has been drawn up with reference to, and in accordance with the guidance set out in, the following documents:

a. UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education:
http://www.qaa.ac.uk/quality-code
b. QAA Subject Benchmark Statement: Computing Master's Degrees (2019)
https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-computing-(masters).pdf
c. Keele University Regulations and Guidance for Students and Staff: http://www.keele.ac.uk/regulations

Version History

This document

Date Approved: 17 April 2023

Previous documents

Version No	Year	Owner	Date Approved	Summary of and rationale for changes
1	2022/23	THEO KYRIACOU	19 August 2022	
1	2021/22	THEO KYRIACOU	28 July 2021	