



Programme Specification Template - Postgraduate

Please note:

- Guidance notes for staff or suggestions for the design and functionality of the database are in grey highlight. **Guidance notes should be deleted in the final version.**

SECTION A: CORE INFORMATION

1. Name of programme: Data Science
2. Award title:
MSc in Data Science
Post Graduate Diploma in Data Science
Post Graduate Certificate in Data Science
3. Programme linkage: Is this part of group of linked programmes between which students can transfer at agreed points? (e.g. a group of programmes with a common set of taught modules)
No
4. Is the programme a top-up only? No
5. Level of award: Level 7
6. Awarding body: University of Sunderland
7. Department: **Faculty of Computer Science**
8. Programme Studies Board: **Computing Postgraduate**
9. Programme Leader: **Dr David Nelson**

10. How and where can I study the programme?

Tick all boxes that apply

At Sunderland:	
Full-time on campus	X
Part-time on campus	X
As work-based learning full-time	
As work-based learning part-time	
As a full-time sandwich course	
As a part-time sandwich course	
By distance learning	

At the University of Sunderland London campus:	
Full-time on campus	
Part-time on campus	
As work-based learning full-time	
As work-based learning part-time	
As a full-time sandwich course	
As a part-time sandwich course	
By distance learning	

At a partner college:	
Full-time in the UK	
Part-time in the UK	
Full-time overseas	
Part-time overseas	X Hong Kong?
By distance learning	
As a full-time sandwich course in the UK	
As a part-time sandwich course in the UK	
As a full-time sandwich course overseas	
As a part-time sandwich course overseas	
As work-based learning full-time in the UK	
As work-based learning part-time overseas	
Other (please specify)	

Free text below to give further brief details (optional) – e.g. that the partner teaches the first part of the programme after which students progress to Sunderland. (Maximum 150 words)

11. How long does the programme take?

	Min number of years / months	Max number of years / months
Full-time	14 months	42 months
Part-time	24 months	72 months
Distance learning		
Work-based learning		

For start-dates please see the current edition of the Prospectus or contact the relevant department at the University. For start-dates for programmes delivered in a partner college, please contact the college.

SECTION B: FURTHER CORE INFORMATION

Use [Outline Programme Proposal Form for ADC](#), for questions 12 to 23

24. Learning and teaching strategy

The general learning, teaching and assessment strategy used within this programme reflects the Faculty standard for postgraduate taught programmes and embraces the Faculty Learning and Teaching Plan. The fact that the MSc in Data Science is dealing with graduates and educating them to Masters level means that the students are expected, and have the ability, to carry out a significant quantity of independent study. This may take the form of directed reading of research papers and advanced technical material, applied practical work utilising the tools and techniques appropriate to Data Science and the resolution of Big Data problems.

The programme is designed to enable students to learn about the principles, theories, and practices associated with Data Science and to apply these in a series of exciting and innovative ways. The programme encourages students to learn from leading researchers and practitioners in Data Science and as such lectures are underpinned with the opportunity to solve real world data science problems, where possible these will be set from industrial and business contexts and case studies. The case studies will be derived from collaborative partnerships, for example from the NHS, Sunderland Council, Accenture, Northumbria Police, HPE and more. The intention is to give students an environment to explore and understand the Data Science issues, identify opportunities to utilise and apply Data Science principles and techniques, and prepare students for career development in the Data Science domain.

Negotiated learning is mainly used within the project module of this programme, but some of the assessment topics for modules (e.g. "Big Data in Organisations") will be negotiated between students and tutors. In the project module, the negotiation will centre on the terms of reference that the student wishes to propose. A central objective within the terms of reference of PROM01 will be the delivery of the product or artefact required by the client. However, the route by which this is achieved, and the topic and scope of the research that will interlink with it, are decided under negotiation between the student and supervisor (these decisions will be ratified during project reviews).

25. Retention strategy

Support and guidance is offered to students through a comprehensive set of mechanisms in order to address retention. In addition to the details provided in the student support section retention on the MSc Data Science programme will be addressed via student support and guidance, access to programme leader, module leaders, and personal tutors, during induction, via programme information (programme handbook), and access to student services and pastoral support.

All students have access to their Programme and Module Leaders as appointments can be made with staff. Students' problems generally will be dealt with through the Programme Leader. The students also have representation on the Boards of Studies and the Staff Student Liaison Committees.

Programme Leaders meet regularly with their tutees to take soundings and obtain feedback on various issues, and to talk to students individually to provide important academic guidance.

All students have access to a personal tutor. At postgraduate level the students' personal tutor is their programme leader. Students can request to speak to their programme leader in confidence regarding any personal issues. In the case where a student, for example, would feel uncomfortable speaking with their programme leader (for example a female student may wish to speak with a female member of staff) then the programme leader will attempt to arrange for the student requests to be met as soon as possible.

All on-campus students have access to the University's central support services including Counselling, Disability Service, Health and Well-being, Chaplaincy, financial support and advice, International Office and Careers and Employability Service. The Students' Union provides an independent service which offers advice and support across the full range of personal and academic problems which students may encounter. Students wishing to lodge a complaint or an appeal can seek advice from the Students' Union or from Academic Services. Full details of all these services can be found on the University's web-site. Where appropriate, academic or support staff in the Faculty will sign-post students to these specialist services.

26. Any other information

The programme has been designed to incorporate the University's principles and expectations of "inclusive programme design" in particular taking into account the requirements and availability of learning materials in hard copy / printed copy and online (taking into account W3C standards) – alternative formats will be signposted. All teaching and learning activities (see below) are designed to be inclusive by anticipating the most common problems that students with wide ranging levels of abilities may face. The teaching on the programme will embrace the principles of inclusive design for example by making whole module sets of material available in advance for students, use of vocabulary lists, facilitating recording of sessions, etc. The resources to be used on the programme comply with disability access requirements for University buildings – mainly in David Goldman Informatics Centre.

The Faculty of Computer Science utilises centralised disability support services to assess all students who require support on an individual basis. This is to ensure that appropriate support is identified and that a schedule is implemented to provide that support as necessary.

SECTION C: TEACHING AND LEARNING

27. What is the programme about?

The aims of the programme are to:

Provide you with advanced knowledge of Data Science topics and specialist areas such as data mining, machine learning, data visualization and security of Big Data, including state of the art techniques, programming toolkit, and industrial and societal application scenarios.

Develop your research skills applicable to a career as a data scientist in industry or subject specialism or academia.

Stimulate your interest in the numerous applications of Data Science, including social media, business intelligence, Big Data, and the contextualized use of Data Science, Big Data.

28. What will I know or be able to do at the end of the programme? These should be brief bullet points for each sub-heading.

Learning Outcomes Postgraduate Certificate – Skills

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **S1** Independently and objectively, critically review, consolidate and extend their knowledge to produce a systematic and coherent body of information in the context of Data Science
- **S2** Work independently and make objective decisions relating to complex Data Science and Big Data problems and challenges
- **S3** Utilise and exploit the range of opportunities afforded by Big Data in specific contexts and settings

Learning Outcomes Postgraduate Certificate – Knowledge

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **K1** undertake a thorough appraisal and understanding of a broad range of current methods and concepts at the forefront of Data Science, including the Big Data life cycle
- **K2** develop a thorough and critical understanding of key aspects of Data Science as an academic discipline
- **K3** critically apply appropriate research techniques with reference to studying Data Science
- **K4** understand at a conceptual level the theoretical underpinnings of Data Science

Learning Outcomes Postgraduate Diploma – Skills

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **S4** design, build and evaluate complex ecosystems required in Data Science applications using a wide range of methods, tools, techniques, languages and platforms for data storage, data analysis, data analytics and visualisation of Big Data
- **S5** create robust Big Data application environments and integrate them with supporting architectures and infrastructures
- **S6** evaluate the risks and commercial opportunities associated with the use of Data Science tools and techniques applied to Big Data sets
- **S7** apply creativity and innovation to Big Data and Data Science problems and opportunities

Learning Outcomes Postgraduate Diploma – Knowledge

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **K5** have a critical awareness of the legal, professional, ethical, social and security issues associated with Big Data systems
- **K6** develop an appreciation of how architectures, infrastructure, operating systems, platforms and software interoperate to support Data Science and Big Data applications
- **K7** critically evaluate the data storage technologies utilised in Data Science including their use to maximise the opportunities afforded by Big Data

Learning Outcomes Masters – Skills

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **S8** design and undertake independently, a major research project on a topic which relates to the forefront of the academic discipline of Data Science and reflect extensively and objectively on method, process and outcomes
- **S9** independently conduct research or advanced technical or professional activity on a project whose title is in the domain area of Data Science demonstrating self-direction and originality in tackling and solving problems, and critically evaluating sources
- **S10** deal with complex issues in Data Science both systematically and creatively, make informed judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences

Learning Outcomes Masters – Knowledge

By the end of this part of the programme successful students should know, understand or be able to do the following:

- **K8** critically apply management concepts and techniques, including the use of advanced tools for the management of Data Science projects
- **K9** apply advanced knowledge in a highly specialised area, application or specialism in the discipline of Data Science, via an individual project

29. What will the programme consist of?

Taught postgraduate programmes generally consist of a number of taught modules leading to the award of a Postgraduate Certificate (60 credits) or Postgraduate Diploma (120 credits). A Masters qualification (180 credits) usually culminates in a major piece of independent work such as a project or dissertation. All modules are at postgraduate level (level 7 in the UK's national scheme). The summary below describes briefly what is contained in the programme. The programme structure, including a detailed list of modules, can be found in the [programme regulations](#).

The Masters in Data Science provides you with a thorough grounding in the analysis and use of large data sets, data analytics, data visualization, together with experience of conducting a development project, preparing you for responsible positions in the Big Data and related IT industries. Data Science provides a huge opportunity to harness new forms of data with increasingly powerful computer techniques which will increase operational efficiency, improve services and provide better insights for decision making and policymaking. This programme will develop skills and knowledge to provide graduates with the confidence to use Data Science tools and techniques to be innovative in using Data Science, solve Big Data Problems, create opportunities for analytics and visualization and enable effective and efficient use of Big Data.

CETM24 – Data Science Fundamentals. In this 30 credit module students will learn how to different types of data, including how to fuse more than one dataset together. They will apply a full gamut of traditional and intelligent analytics on a variety of datasets and make use of modern Data Science/Big Data platforms and languages. Techniques and tools for presenting and visualization will be covered.

CETM50 Technology Management in Organisations. The aim of the module is to critically discuss the management, organisation and use of cybersecurity and data science principles,

policies and procedures in organisational settings. Students will have the opportunity to contextualise technology management ecosystems related to cybersecurity and data science depending on their field of interest and to examine the added value from technology as a business enabler. Students will also learn to apply the principles, policies and procedures of cybersecurity and data science to provide resilient and robust organisational solutions for secure and valuable information. Students will develop techniques and use tools that will enable them to undertake critical analysis of the challenges and opportunities of using cybersecurity to mitigate and manage risk to data and enable business continuity in the case of data breaches. They will also develop a critical understanding of governance, standards, audit, assurance and review in order to evaluate the challenges in managing technology.

CETM47 Machine Learning and Data Analytics. This module covers key background for understanding of three interrelated subjects, i.e. machine learning, data mining, and data analytics including relevant professional, ethical, social and legal aspects. It also presents such topics as information and knowledge management, problems with data, approaches to selection of data analytics tools, principles of modelling and simulation, and operations research. This module introduces the trends, tools, and current developments in the area of machine learning, data mining and data analytics and their practical applications....

CETM46 Data Science Product Development. In this 30 credit module, students will learn how to design and develop a data science product to solve a challenging real world problem, which will be based on a systemic literature review on state of the art data science software technologies and project development methodologies, prototyping the product with end users' evaluations, and producing a project summary report.

Students who pass 60 credits (which must include CETM24 Data Science Fundamentals) are eligible for a Postgraduate Certificate in Data Science. Students who pass an additional 60 credits are then eligible for a Postgraduate Diploma in Data Science.

The final part of the MSc programme consists of a 60 credit project module **PROM02** Computing Master's Project. In this module the student will develop a practical deliverable as well as investigating an area of academic research that informs the practical aspect of the project. Wherever possible the project will have a real client, who may come from either inside or outside of the institution (possibly utilising learning analytics), and has a need for a real practical deliverable in the Data Science and Big Data domains.

PG Cert, PG Diploma and MSc requirements are summarised in the table below.

Post Graduate Certificate in Data Science	To obtain PG Certificate students need to pass CETM24 (30 credits)	Plus 1 30-credit module from CETM46, CETM47, CETM50
Post Graduate Diploma in Data Science	To obtain PG Diploma students need to pass all taught modules, i.e. CETM24, CETM46, CETM47 and CETM50	
MSc in Data Science	To obtain MSc students need to pass all modules for PG Diploma and also the 60 credit project module PROM02	

30. How will I be taught? Modes of teaching and learning aligned with KIS – choose one or more

Scheduled teaching activities	X
Independent study	X
Placement	

Students will be given the opportunity to study the range of Data Science programmes in a variety of different approaches. The topics in the various modules will be normally be introduced through a series of lectures led by academics who are active researchers in the subject matter and supported by guest lecturers from business and industry. Students will have the opportunity to understand tools and techniques in Data Science, develop skills in a range of topics including analytics, visualisation and machine learning through applied exercises a series of seminar / tutorial and practical activities. Students will have the opportunity to apply Data Science principles to real world Big Data challenges and problems. The programme will develop the students' research skills by encouraging them to participate in research into Big Data security topics, deliver research seminars and present the findings of their research. Students will have the opportunity to explore the subjects in depth through guided independent study. A key approach to teaching and learning utilised in the MSc Data Science is Problem Based Learning (PBL) (drawing on the pedagogic experience in the department – currently there is a Higher Education Academy research project on PBL being run in the department giving the students the opportunity to examine Data Science subjects using innovative pedagogy.

The objective of the students-staff contact time in lectures is to introduce theories, concepts case studies and scenarios and to set milestones and learning goals, and make new ideas and concepts accessible to the students. These ideas are then followed up in tutorials and in the students' own time. Tutorials / seminars and laboratory activities are used within each module to provide support for lectures – giving students the opportunity to apply theoretical concepts to practical problems – many of these practical problems will be set in collaboration with industrial and business partners to the University including Sagezza, IBM, Accenture, HPE, Geek Talent, Sunderland NHS Trust and Sunderland City Council. The prime objectives of tutorial time are to allow in-depth study of particular topics that have been introduced and also for practical exercises. As well as requiring a significant amount of individual study, the course also encourages group working. This is in recognition of the fact that a graduate of the course will normally be employed in environments where significant demands will be made upon his or her ability to co-operate and collaborate with others.

In addition students are expected, and have the ability, to carry out a significant quantity of independent study. Students will be supported in developing the skills to do this for example in CETM50, 'Technology Management for Organisations', and CETM24 'Data Science Fundamentals'. This may take the form of directed reading of research papers and advanced technical material, research activities, or practical work on various software problems and packages. The level of independence increases throughout the programme culminating in the project module, PROM02 where students have the opportunity to demonstrate knowledge and skills from the taught modules and take them to a higher level.

As well as developing skills and abilities in the domain of Data Science students will have the opportunity to develop masters level skills, including, but not limited to: research skills (across all modules); gathering and using information (particularly in data analytics); synthesising information/data; applying methodologies, applying concepts, creating new concepts/ideas/products, analysing and evaluating, critical reasoning, and information retrieval skills.

Throughout the programme, across all modules, students will be encouraged to take into account professional, ethical, social and legal constructs in the context of Data Science and Big Data. In the Data Science project students will have the opportunity to apply legal, ethical, social and professional

issues (LSEPIs) when designing their project study and use LSEPIs to underpin the approach and all communication with the client. The professional body (British Computer Society) expectations are embedded throughout the programme – which will help with any students seeking to develop their careers by obtaining chartered status (CITP or CEng).

A list of the modules in the programme can be found in the [Programme Regulations](#).

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the [Matrix of Modes of Teaching](#).

31. How will I be assessed and given feedback? Modes of assessment aligned with KIS: choose one or more.

Written examinations	
Coursework	X
Practical assessments	X

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the [Matrix of Modes of Teaching](#).

The generic assessment criteria which we use can be found [here](#). Some programmes use subject-specific assessment criteria which are based on the generic ones.

This programme uses the Generic University Assessment Criteria	YES	NO
This programme uses the Subject Specific Assessment Criteria	YES	NO

The University regulations can be found [here](#).

The assessment throughout this programme is a mixture of methods appropriate to the modules under study. Each assessed 30 credit module will typically have two assessments.

The students experience a diverse range of assessment strategies across the programme, enabling them to display various skills associated with Masters level learning. This will include research papers, tutorial design, analysis of Data Science and Big Data problems, application of Data Science tools and techniques, formal paper reviews, and presentations. The assessment strategies chosen within each module are appropriate to the content and style of delivery and have been further selected in order to provide a rich mixture of diverse assessment strategies while ensuring that the module aims and objectives can be accurately assessed.

Individual assignments include different forms of assessment strategies. Formative assessment is an important part of this module and includes an element whereby the students critically evaluate each other's work. The module CETM50 Technology Management for Organisations includes an assessment where students produce either a research report or essay on a relevant topic. CETM47 (Machine Learning and Data Analytics) Module includes assessments where students produce reports with research components on a relevant topic. In CETM24, Fundamentals of Data Science, students complete a number of exercises both practically oriented as well as containing short written critical review and evaluation reports.

Every attempt is made to ensure that the assessments are based on real world problems and challenges with assessments briefs being developed in collaboration with industrial and business

partners where appropriate and as such have relevance to employers and help develop employability criteria for students. Examples of relevant, real world applications can be seen in examining issues around the developing competitive advantage from Big Data 'Technology Management for Organisations', how to make efficient use of Big Data in 'Data Science Product Development and how to examine and evaluate Big Data in 'Data Analytics'. All of these examples will encourage output from the assessment which can be used and applied in the workplace either directly by students or in the form of reports / recommendations etc. for work based clients.

The project module PROM02 encompasses a wide range of assessment styles whereby students produce a practical deliverable for a real client, a substantial and methodical research report which informs development of the practical deliverable and which must be relevant to the programme, a thorough evaluation of all stages of the project, and documentation evidencing project management and control of a substantial project.

The University aims to return marked assessments and feedback within 4 working weeks of the assignment submission date after internal moderation process have been completed. If this is not possible, students will be notified by the Module Leaders when the feedback is available and how it can be obtained.

The Academic Misconduct Regulations and associated guidance can be found [here](#). It is the responsibility of students to ensure they are familiar with their responsibilities in regards to assessment and the implications of an allegation of academic misconduct.

Students should refer to the [University Regulations](#) for information on degree classifications.

32. Teaching, learning and assessment matrix

Matrix of modes of teaching, learning and assessment - MSc

NB. Not all option modules may be offered in any one academic year and will depend on the availability of staff and the priorities of the school. In addition, modules will usually need to be selected by a minimum number of students. Option modules may be available on more than one programme and the Programme Leaders will liaise with the Faculty Management Team to ensure there is a reasonable amount of choice in any given year.

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO S1	LO S2	LO S3	LO S4	LO S5	LO S6	LO S7	LO S8	LO S9	LOS10	
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed		Taught Developed Assessed	Taught Developed	
Technology Management for Organisations	CETM50	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught	Taught	Taught	Taught Developed Assessed	Taught	Taught Developed Assessed	
Machine Learning and Data Analytics	CETM47	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Developed	Developed	Developed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		Developed	Taught	
Data Science Product Development	CETM46	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught	
Computing Master's Project	PROM02	Core	Lectures, Tutorials, Self Study	Coursework	Developed	Developed	Developed	Developed Assessed	Developed Assessed	Developed	Developed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO K1	LO K2	LO K3	LO K4	LO K5	LO K6	LO K7	LO K8	LO K9
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed	Taught Developed Assessed
Technology Management	CETM50	Core			Taught Developed Assessed	Taught Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught Developed Assessed	Taught

for Organisations														
Machine Learning and Data Analytics	CETM47	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	
Data Science Product Development	CETM56	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		
Computing Master's Project	PROM02	Core	Lectures, Tutorials, Self Study	Coursework	Assessed	Developed	Taught Developed					Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed

Matrix of modes of teaching, learning and assessment – PG Diploma

NB. Not all option modules may be offered in any one academic year and will depend on the availability of staff and the priorities of the school. In addition, modules will usually need to be selected by a minimum number of students. Option modules may be available on more than one programme and the Programme Leaders will liaise with the Faculty Management Team to ensure there is a reasonable amount of choice in any given year.

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO S1	LO S2	LO S3	LO S4	LO S5	LO S6	LO S7	LO S8	LO S9	LOS10
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed		Taught Developed Assessed	Taught Developed
Technology Management for Organisations	CETM50	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught	Taught	Taught	Taught Developed Assessed	Taught	Taught Developed Assessed
Machine Learning and Data Analytics	CETM47	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Developed	Developed	Developed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		Developed	Taught
Data Science Product Development	CETM46	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO K1	LO K2	LO K3	LO K4	LO K5	LO K6	LO K7	LO K8	LO K9
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed	Taught Developed Assessed
Technology Management for Organisations	CETM50	Core			Taught Developed Assessed	Taught Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught Developed Assessed	Taught
Machine Learning and Data Analytics	CETM47	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	

Data Science Product Development	CETM56	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		
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Matrix of modes of teaching, learning and assessment – PG Certificate

NB. Not all option modules may be offered in any one academic year and will depend on the availability of staff and the priorities of the school. In addition, modules will usually need to be selected by a minimum number of students. Option modules may be available on more than one programme and the Programme Leaders will liaise with the Faculty Management Team to ensure there is a reasonable amount of choice in any given year.

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO S1	LO S2	LO S3	LO S4	LO S5	LO S6	LO S7	LO S8	LO S9	LOS10
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed		Taught Developed Assessed	Taught Developed
Technology Management for Organisations	CETM50	Option	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught	Taught	Taught	Taught Developed Assessed	Taught	Taught Developed Assessed
Machine Learning and Data Analytics	CETM47	Option	Lectures, Seminars, Tutorials, Self-study	Coursework	Developed	Developed	Developed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		Developed	Taught
Data Science Product Development	CETM46	Option	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught

Module	Code	Core / optional	Modes of T&L	Modes of Assessment	LO K1	LO K2	LO K3	LO K4	LO K5	LO K6	LO K7	LO K8	LO K9
Data Science Fundamentals	CETM30	Core	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed	Taught Developed	Taught Developed	Taught Developed	Taught Developed Assessed
Technology Management for Organisations	CETM50	Option			Taught Developed Assessed	Taught Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed			Taught Developed Assessed	Taught
Machine Learning and Data Analytics	CETM47	Option	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	

Data Science Product Development	CETM56	Option	Lectures, Seminars, Tutorials, Self-study	Coursework	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed	Taught Developed Assessed		
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*Indicates a compulsory module which must be successfully passed for progression to further modules or to the next academic year of study

33. How does research influence the programme?

The Faculty of Computer Science in general and the Department in particular is committed to the close coupling of research and teaching activities so that our research underpins the teaching we deliver. Research active staff are involved in the delivery of teaching across the complete range of our programmes. We actively map teaching teams to modules based on the relevance of their current activities and previous experience. The resulting cross-fertilisation of research and teaching means that our modules remain current in a rapidly developing field.

The MSc programme in Data Science is heavily influenced by the research interests of the academics involved in the delivery of the modules. All of the academics who are designated module leaders were returned in the most recent REF. Academic expertise in Data Science, data analytics, visualisation, machine learning, statistics and cybersecurity are embedded throughout the modules on the programme and underpin the learning outcomes of the MSc. Current research projects will be utilised to provide case studies and examples in the research active curriculum. Research specialisms and interests from colleagues in the department teaching on the programme include (but are not limited to): novel techniques for managing and discovering knowledge in Big Data sets; using Big Data to address cybercrime; Big Data and cybersecurity, Big Data challenges in digital forensics, data visualisation tools and techniques, effective and efficient data warehousing, and techniques for enhancing data analytics. Examples of current projects include NHS Trust data analytics in the use of social media to gather and analyse Big Data; using Big Data to enable preventative policing with regional police forces; visualisation of Big Data in collaboration with Sunderland City Council and ethical standards of Big Data usage.

The MSc in Data Science is heavily influenced by research both in terms of inclusion of research interests of academic staff and collaborative projects with industrial partners. The department has a strong track record of Knowledge Transfer Partnerships as a means of formalising applied research.

The department has recently recruited a new Professor of Data Science who joins the delivery team for the MSc. The new member brings an international perspective to Data Science research and Data Science development with particularly strong links to China and the very interesting Data Science challenges facing that country.

We have a proud history of direct involvement from our students within our research activities. Masters projects are actively sourced from research areas in the department and the University and recent publications have featured project work undertaken by students who have been included as named authors. Students have the opportunity to develop their research skills in a number of ways including as researchers through student led seminars, applying research (PROM02) and becoming part of the research community in the department. Students will have the opportunity to participate in the Department's Research Seminar Series where one of the most active strands of the series focuses on Big Data.

SECTION D EMPLOYABILITY

34. How will the programme prepare me for employment?

The speed at which individuals, businesses, organisations and governments are generating data is increasing at an unprecedented rate. Feedback from employers suggest that there is a significant skills gap in Data Science – there is a need for skilled professionals to make sense of the huge amount of data being generated by information systems, the Internet, mobile technologies, social media and the Internet of Things. Gathering Big Data, preparing Big Data for use (giving structure to unstructured data), wrangling Big Data, analysing using data analytics, visualising and making sense of big data requires a professional with an

understanding, awareness and ability to apply a set of new methods and techniques. The MSc in Data Science seeks to develop graduates who will become proficient data scientists with the technical knowledge base and skills set to master the complex problems and complex data requirements emanating from Big Data. The programme will enable graduates to utilise the constantly changing and evolving modern technologies that continuously reshape the way digital interaction and communication takes place. Recent government reports such as **UK Commission for Employment and Skills (2013)** suggests that the digital sector will require nearly 300,000 new recruits by 2020 and one of the key findings in the report suggests that specialist demand will include “high level IT specialisms, such as IT Architects, Data and Security specialists”. The McKinsey Report (2011) “following the 'Big Data' boom, there is a clear and continuing shortage of individuals who are able to fulfill the Data Scientist role (McKinsey, 2011). Rather than skills gap being addressed or the demand for data scientists to fall, “ the demand for people with data science skills is predicted to double over the next five years”.

The MSc Data Science programme has been designed in collaboration with employers in the region, including, Sagezza, IBM, Accenture, HPE, Sunderland NHS Trust, Sunderland City Council, BA and Sage. One of the primary motivations for developing the Data Science programme was to address the skills gap in Data Science and Big Data in the region. The programme learning outcomes, the content of the programme and the content and curriculum for each module has been designed in order to address the subject specific needs of employers. Each module has included a definition of the transferrable skills that are specifically developed in the individual modules. The transferable skills have been designed to enhance the employability of students.

Discussions with employers have identified three key employability categories. The programme has been designed in such a way as to enable graduates to enter each of the following category types.

- 1 Manager – needs high level understanding or principles of Big Data and what it is that Big Data can provide for the organisation.
- 2 Technical Professional – this type of professional is primarily concerned with making sense of the technical opportunities in Big Data and Data Science. In many respects this is very similar to a statistician (and may be one) but knows the practical Big Data details of working with data that aren't taught in the statistics curriculum: data cleaning, methods for dealing with very large data sets, visualisation, deep knowledge of a particular domain, writing well about data, and so on. In addition this type of job may involve design and development (taking into account programming and coding) of Big Data systems and implementation of Big Data infrastructures and architectures.
- 3 Analytical Professional – this type of professional shares some statistical background with the technical professional. This type of professional is mainly interested in using data “in production”. They build models which interact with professionals, often serving recommendations and helping to understand and exploit the opportunities associated with data analytics and use of Big Data.

The Faculty of Computer Science works closely with the University's central Careers and Employability Service to ensure that students have access to career opportunities, specialist talks and support and guidance for career development. For full time students there is a commitment to supporting students in their progression from education to work. For part time students support is given to help with career development and career progression. The Careers and Employability Service is located in the Gateway, an impressive, newly-renovated facility in the centre of the City Campus.

There are also opportunities for on-campus students outside your programme of study.

Where applicable add text about any extra-curricular activities or opportunities provided by the faculty / department to support students' general development, their integration as a cohort, career planning etc.

For information about other opportunities available to our students who study on campus, click [here](#).

Additional opportunities to develop your experiences more widely will vary if you study at one of our partner colleges. For information about the extra-curricular activities available in any of our colleges please contact the college direct.

35. Particular features of the qualification. (optional)

This describes key features relevant to employability and will be reproduced in the HEAR. If any of the following features apply to all students who achieve this award, please describe them briefly below: placement, professional practice element, key programme specific regulations, professional body accreditation.

For example: “Graduates of this programme will have undertaken a minimum of 80 hours in professional practice. Completion of this programme entitles the graduate to Associate Membership of the Origami Council.” (Maximum 150 words)

36. Professional statutory or regulatory body (PSRB) accreditation. Choose one of the following.

PSRB accreditation is not relevant to this programme	
PSRB accreditation is currently being sought for this programme	
This programme currently has PSRB accreditation	X

The programme is currently accredited until: 2022

The implications of the accreditation not being renewed are:

Please see [PSRB Renewal Process](#) for information on the renewal process.

The relevant PSRB(s) is/are:

British Computer Society

The terms of the accreditation are as follows:

- Students must complete their programme of study within six years.
- Students must have completed the entire programme at the University of Sunderland.

The programme is recognised as:

Initial CITP Further Learning and CEng (partial fulfilment)

The programme is accredited dependent on

Successful completion of 180 masters credits

This depends upon successful completion of the programme.

Is membership of the PSRB dependent on further requirements? No

There are no programme-specific regulations relating to this award.

The modules to be studied	n/a
Pass-marks for some or all modules and/or parts (elements) of modules	n/a
Placement requirements	n/a
Attendance requirements	n/a
Professional practice requirements	n/a
Final or overall mark for the award	n/a
Other	n/a

Interim or exit awards are not accredited.

Free text for description which is not covered by the options above.

(Maximum 50 words)

Repeat if necessary for more than one PSRB

SECTION E: PROGRAMME STRUCTURE AND REGULATIONS

See Appendix 1.

SECTION F: ADMISSIONS, LEARNING ENVIRONMENT AND SUPPORT

40. What are the admissions requirements?

Entry point (delete those not required)	Standard entry requirements ¹	Entry with advanced standing ²	Other ³
Level 7 (Masters awards) – start of programme	An honours degree (2:2 or above) or equivalent in a computing or related non-computing discipline (mathematics, statistics, engineering) or an honours degree (2:1 or above) in relevant non-computing or related degree (degree which has numeracy included and / or application of big data as a significant theme).	Not applicable	Students who have 5 years relevant business or industry experience
Level 7 (Masters awards) – after Certificate	Not applicable	Not applicable	

Level 7 (Masters awards) – after Diploma	Not applicable	Not applicable	
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Applicants whose first language is other than English must fulfil the University's minimum language skills requirement through one of the accepted mechanisms.

The University's standard admissions requirements can be found in the [university regulations](#). Programme-specific requirements which are in addition to those regulations are given below.
(Maximum 100 words)

Can students enter with advanced standing?	Yes	No
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The University has a process by which applicants whose experience to date already covers one or more modules of the programme they are applying for may seek Accreditation of Prior Learning (APL). Full details can be found [here](#) but if you think that this may be relevant to you, please contact the department which offers the programme you are interested in.

APL and APEL are not normally applied in this programme.

- 41.** What kind of support and help will there be?
a. in the department:

The overall strategy for support and guidance is three-pronged: accessibility to staff and resources; provision of relevant and reliable information; and operation of a responsive system for managing problems as they arise.

Support and guidance is offered to students through a comprehensive set of mechanisms. All new students are given a week-long induction programme during which time they are exposed to various aspects of student academic life and much information on the University and its Services, the Faculty of Computer Science and their chosen programme of study. They are provided with programme information, talks by programme and module staff, library visits, talks by representatives from a number of important student services such as the International Office and the University language Scheme including English for Academic Purposes for students whose first language is not English.

All students have access to their Programme and Module Leaders as appointments can be made with staff. Students' problems generally will be dealt with through the Programme Leader. The students also have representation on the Boards of Studies and the Staff Student Consultative Committees. Programme Leaders meet regularly with their tutees to take soundings and obtain feedback on various issues, and to talk to students individually to provide important academic guidance.

Library facilities for students are provided across both campuses and offer an innovative learning environment, an electronic environment which offers access to online resources, the campus network and the Internet, and areas for group and individual study. A summary of the major features of the Web provision, which will be available to the students, is given below:

- complete staff list, telephone numbers, Email addresses and module responsibilities;
- complete list of Faculty of Computer Science programmes, modules with links to programme structures and module descriptors;
- generic student handbook including links to Faculty home pages, University sites e.g. Student Services, Careers, Information Services, Campus maps and various Faculty and University policy documents e.g. rules on infringement, the Modular Credit Scheme and Teaching & Learning policies;

- health & Safety advice;
- the use of Canvas (on-line learning environment) to act as a student support and feedback mechanism.

All students have access to a personal tutor. At postgraduate level the students' personal tutor is normally their programme leader. Students can request to speak to their programme leader in confidence regarding any personal issues. In the case where a student for example would feel uncomfortable speaking with their programme leader (for example a female student may wish to speak with a female member of staff) then the programme leader will attempt to arrange for the student requests to be met as soon as possible.

for careers guidance through the programme / department. (Maximum 500 words)

b. *in the university as a whole:*

The University provides a range of professional support services including [wellbeing](#), [counselling](#), [disability support](#), and a [Chaplaincy](#). Click on the links for further information.

c. *in a partner college:*

Please see the relevant college prospectus or website for details of student support if you are planning to study in one of our partner colleges.

42. What resources will I have access to?

On campus	X	In a partner college		By distance learning	
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On campus

Tick all that apply

General Teaching and Learning Space	X
IT	X
Library	X
VLE	X
Laboratory	X
Studio	
Performance space	
Other specialist	
Technical resources	X

In terms of our teaching staff, the module leaders have been chosen with regard to their expertise in the subject area and in many cases they, and their teaching team, are working on relevant research and/or external engagement projects. This enables staff to practice research informed teaching thus providing students with an appreciation of relevant research themes, an idea of where and how the subject is developing in the future and, in many cases, “real world” case studies. External speakers are solicited from collaborating companies and our own recent graduates in order to provide students with access to relevant practitioners who can provide industrial context.

The list of module leaders involved in the delivery of this programme can be seen in Appendix 2.

The Faculty makes full use of the University’s Virtual Learning Environment (Canvas) and our strategy is for every module and programme to have an online presence. Key features of our current Canvas provision include:

- complete staff list, telephone numbers, Email addresses and module responsibilities;

- complete list of Faculty modules with links to detailed module descriptors and, in many cases on-line learning resources;
- general student handbook including links to Faculty home pages, University sites e.g. Student Services, Careers and Employability Service, Information Services, Campus maps and various Faculty and University policy documents e.g. rules on cheating and collusion, the Modular Credit Scheme and Teaching & Learning policies;
- Faculty Programme/Module timetables;
- Faculty Standards;
- A Code of Conduct for Use of the Computing Terraces;
- Health and safety advice;
- Information about the Faculty's research activities.

Library facilities available at St Peters include a dedicated computing subject collection, a comprehensive range of electronic resources, open access areas for group and individual study, and dissertations / research working papers from the Faculty are also housed in the library.

Specialist Resources

All students in the Faculty are provided with access to one of the most modern and best equipped computing environments in the UK. The David Goldman Informatics Centre features an open plan area made up of terraces which contain nearly 250 workstations comprising PCs and MACs. The computers on the terraces are installed with all the necessary software packages required and are normally available to the students on an open access basis 7:00am until 9:00pm weekdays. 24 hour computing facilities are available at the Murray Library.

In support of independent study, students are provided access to the Internet for their smartphones, tablets and laptops via a university wide wireless network. A range of free software is also made available to students through volume licensing with partners such as Adobe, Symantec, Microsoft and Cisco.

The programme makes use of specialist hardware (including a 40 core grid computer, Dell R920 60 core processor, 1 G RAM & high capacity storage) and software resources for the MSc Cybersecurity programme. These will enable students to understand the relationship between hardware and software in cybersecurity management and the development of cybersecurity solutions. The cybersecurity programme and modules will utilise the specialist network security laboratories and the forensics / breach management laboratory.

The Enterprise Place is supported by the Sunderland Software City initiative and provides dedicated rooming and facilities to host entrepreneurial activities in Cybersecurity. Students with business ideas can become resident in Enterprise Place as they attempt to grow from ideas on how to exploit Cybersecurity opportunities to fully formed businesses.

Information about the University's facilities can be found [here](#).

Please see the relevant college prospectus or website for details of college learning resources if you are planning to study in one of our partner colleges.

43. Are there any additional costs on top of the fees?

No, but all students buy some study materials such as books and provide their own basic study materials.	X
Yes (optional) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are additional costs for optional activities associated with the programme (see below)	

Yes (essential) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are essential additional costs associated with the programme (see below)	
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44. How are student views represented?

All taught programmes in the University have student representatives for each programme who meet in a Student-Staff Liaison Committee (SSLC) where they can raise students' views and concerns. The Students' Union and the faculties together provide training for student representatives. SSLCs and focus groups are also used to obtain student feedback on plans for developing existing programmes and designing new ones. Feedback on your programme is obtained every year through module questionnaires and informs the annual review of your programme. Student representatives are also invited to attend Programme and Module Studies Boards which manage the delivery and development of programmes and modules. Faculty Academic Committee, also has student representation. This allows students to be involved in higher-level plans for teaching and learning. At university level on Students are represented on University level Committed by sabbatical officers who are the elected leaders of the Students' Union.

The University's student representation and feedback policy can be found [here](#).

Every year we participate in the national Postgraduate Taught Experience Survey (PTES).

Programmes offered in partner colleges: If you are studying in one of our partner colleges the college will have its own mechanisms for obtaining student feedback. Some of these may be the same as those on-campus at the University but others may be different. You should ask your college for further information.

For distance learning operated from Sunderland: if you are studying by distance learning you will have slightly different arrangements from those used on campus. In particular you are likely to have virtual rather than physical meetings and discussions. However these arrangements should provide comparable opportunities for you to give feedback. Details are given below.

SECTION G: QUALITY MANAGEMENT

45. National subject benchmarks

The Quality Assurance Agency for Higher Education publishes benchmark statements which give guidance as to the skills and knowledge which graduates in various subjects and in certain types of degree are expected to have. They do not cover all subjects at postgraduate level but those which exist can be found at [here](#).

Are there any benchmark statements for this programme?	YES	NO
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The subject benchmark(s) for this programme is/are:

Masters Computing Benchmark

The QAA also publishes a Framework for Higher Education Qualifications (FHEQ) which defines the generic skills and abilities expected of students who have achieved awards at a given level and with which our programmes align. The FHEQ can be found [here](#).

A table mapping the programme learning outcomes against the QAA benchmark for Computing Master's courses can be found in Appendix 4.

46. How are the quality and standards of the programme assured?

The programme is managed and quality assured through the University's standard processes. Programmes are overseen by Module and Programme Studies Boards which include student representatives. Each year each module leader provides a brief report on the delivery of the module, identifying strengths and areas for development, and the programme team reviews the programme as a whole. The purpose of this is to ensure that the programme is coherent and up-to-date, with suitable progression through the programme, and a good fit (alignment) between what is taught and how students learn and are assessed - the learning outcomes, content and types of teaching, learning and assessment. Student achievement, including progress through the programme and the way in which the final award is made, is kept under review. The programme review report is sent to the Programme Studies Board and the Faculty in turn reports issues to the University's Quality Management Sub-Committee (QMSC).

External examiners are appointed to oversee and advise on the assessment of the programme. They ensure that the standards of the programme are comparable with those of similar programmes elsewhere in the UK and are also involved in the assessment process to make sure that it is fair. They are invited to comment on proposed developments to the programme. Their reports are sent to the Deputy Vice-Chancellor (Academic) as well as to the Faculty so that issues of concern can be addressed.

All programmes are reviewed by the University on a six-yearly cycle to identify good practice and areas for enhancement. Programmes are revalidated through this review process. These reviews include at least one academic specialist in the subject area concerned from another UK university. Quality Assurance Agency (QAA) review reports for Sunderland can be found [here](#).

Further information about our quality processes can be found [here](#).

Please also complete and insert the [SITS form](#).

See Appendix 2.

Appendix 1

PART B - PROGRAMME REGULATION/S

Name of programme: *Data Science*

Title of final award: *MSc Data Science*

Interim awards¹: *Postgraduate Certificate in Data Science, Postgraduate Diploma in Data Science.*

Students who pass 60 credits (which must include 'Data Science Fundamentals' CETM24) are eligible for a Postgraduate Certificate in Data Science. Students who pass all the taught modules on the programme are eligible for a Postgraduate Diploma in Data Science.

Accreditation: *MSc in Data Science has initial accreditation by the BCS for the 2017 intake. The other awards are not accredited.*

University Regulation (please state the relevant University Regulation): *4.2.1. The overall pass mark for each module is 40%. To pass a module a student must also have submitted work for each element of assessment.*

Regulations apply to students commencing their studies from (please state the date / intake that these regulations will apply to students for each Stage):

Regulations apply to students	Date the regulations apply	Intakes affected
Stage 1		
Stage 2		
Stage 3		
Stage 4	September 2018	September 2018 onwards

Stage 4

Core modules:

	Code	Title	Credits
<i>CERT PHASE</i>	<i>CETM24</i>	<i>Data Science Fundamentals</i>	<i>30</i>
<i>CERT/DIP PHASE</i>	<i>CETM46</i>	<i>Data Science Product Development</i>	<i>30</i>
	<i>CETM47</i>	<i>Machine Learning and Data Analytics</i>	<i>30</i>
	<i>CETM50</i>	<i>Technology Management for Organisations</i>	<i>30</i>
<i>MASTERS PHASE</i>	<i>PROM02</i>	<i>Computing Masters Project</i>	<i>60</i>

Optional Modules

None

Elective Modules

None

Progression Regulations

¹ Same as main award unless agreed otherwise at validation – eg to meet PSRB requirements
Version 10

There are no programme-specific progression regulations²

² This will be the norm – university regulations apply
Version 10



Quality Handbook

SITS SUMMARY PROGRAMME/SHORT COURSE DETAILS

(Form to be completed electronically by the Faculty and forwarded to the Quality Support Officer supporting the Approval event, or sent to Planning & MI for faculty devolved processes before sending to Quality Support (with the exception of Short Courses and GRS))

This form is to be completed when a new programme has been validated and approved so that the programme codes and progression and awards rules can be set up in SITS. This also needs to be completed at periodic course review when there have been significant modifications to the course.

Please note that all details entered onto this form will go onto every student's record that is attached to this programme and it is therefore imperative that the information is correct.

1 Programme Details	
New/ Modification/Review: Please ensure the minor modification document is included	Modification
Full Programme Title:	MSc Data Science
If replacement for existing course, specify title and course code:	
Qualification Aim: e.g. Foundation degree of Science, Bachelor of Arts (Honours)	Masters
Qualification Level (NQF level):	7
JACS 3.0 code JACS code = e.g. (V100) History, (I100) Computing Science, etc. See HESA Website https://www.hesa.ac.uk/jacs3	I100
Is the programme Open or Closed: A course is defined as closed when specifically designed for a certain group of people and not also available to other suitably qualified candidates. It may be designed for a particular company however if the same course is also run for other suitably qualified candidates, not employed by the company, then the course is not closed.	Open
Faculty and School:	Computer Science Computer Science
Location of study: e.g. SAGE, Sunderland in London, Sunderland	Sunderland, Hong Kong
Last Date Registration (PBI) Number of days: The number of days after the start date of the course that it is possible for students to register onto it. It is also referred to as the migration date.	15
Programme Leader:	Dr David Nelson
Academic Team for the programme:	Postgraduate computing team
Date of Approval/Modification/Review:	14 th July 2016
Date of next review (QS to complete):	

Accrediting Body or PSRB If yes please attach a completed PSRB form	Yes/No
Programme Specific Regulations If yes, please attach a completed Programme Specific Regulations form	Yes/No/Pending
Does this programme come under the Key Information Set return? If yes, please attach a completed KIS form	No
Is this an undergraduate programme whose primary (but not necessarily only) purpose is to improve the effectiveness of practitioners registered with a professional body? If yes, please specify which body: http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/2016/201622/HEFCE2016_22.pdf (Page 88, paragraph f) e.g. a short course aimed at registered nurses	Yes/No Professional Body:

Interim Awards			
If a student does not achieve their qualification aim, what lower awards might they be entitled to, assuming they have the credits? The subject title for any lower level award should be given where this is different from the subject of the qualification aim.			
	Interim Award Title	Credits Required	Interim Structure Please show mandatory requirements if applicable e.g. core module codes
1	PG Certificate in Data Science	60	CETM24 and one from CETM46, CETM47, CETM50
2	PG Diploma in Data Science	120	CETM24, CETM46, CETM47 and CETM50
3			

Combined Subjects Programmes only	
Will the subject run as Major/Minor/Dual:	
Any subject(s) not permitted to be combined with this subject:	

2 Mode Of Attendance		
01	Full-time <i>Full-time students are those expected to study for more than 24 weeks per year, for a minimum of 21 hours per week and are paying the full-time fee.</i>	Yes
02	Other Full-time <i>Students who attend full-time for a period less than 24 weeks per year</i>	
31	Part-time <i>Students who are expected to study for less than 21 hours per week.</i>	Yes
31	Part-time at Full-time Rate <i>Students who are studying full-time credits over part-time attendance</i>	

3 Admissions	
An admissions or MCR code will be created to allow student applications.	Tick appropriate

U	UCAS Universities and Colleges Admission Services <i>Required for full-time undergraduate programmes only.</i>	
D	Direct Entry <i>Required for FT, PT, PG and PGR, only where students will be admitted through the admissions teams or where the programme needs to be advertised on the web</i>	Yes
G	GTTR Graduate Teacher Training Registry <i>Education only, where applicable</i>	

4 Collaborative Provision	UK	
	Overseas	
Institution	Collaborative Model	Funding Arrangements
5a Course Block		
Full-time - Overall length of the programme in months:	14 months	
Part-time - Overall length of the programme in months:	24 months	
Does this course offer a sandwich placement? If yes , please indicate which programme year this placement is to take place.	Yes/No Programme Year:	
Is this compulsory or optional?	Compulsory/Optional	
Does this course offer a study abroad year out? If yes , please indicate which programme year this placement is to take place.	Yes/No Programme Year:	
Is this compulsory or optional?	Compulsory/Optional	

6 Major Source of Funding	
Please note this relates to funding for the programme and not individual students	
HEFCE Higher Education Funding Council for England	Yes
Skills Funding Agency/EFA/Degree Apprenticeship	
NCTL National College for Teaching and Leadership	
Wholly NHS Funded Partially NHS Funded Departments of Health/NHS/Social Care. <i>For all Health funded programmes please indicate whether the programme is eligible for an NHS Bursary</i> - Eligible for NHS Bursary Y/N	
Standard Fee If no then the Learning Resources Form should be attached	Yes/No
Other Funding:	

– Please Specify:

7 Education Programmes Only	
This section must be completed for any programmes marked above as 'NCTL' funded	
Teacher Training Identifier:	
Teacher Training Scope:	
Qualification Aim: QTS and academic award, QTS only, QTS by assessment only	

DETAILS SUPPLIED BY: ...Dr David Nelson.....
.....

DATE: 19/03/2018

Module List

Award, Route (if applicable) and Level	New/Existing/ Modified Module (N/E/MM)	Module Title	Module Code	Module Credit Value	Whether core or option	Must choose (i.e. designated option):	Assessment weighting – give % weight for each assessment item	Pre-/co-requisites	Module leader	Other comment (if required)	Date of Entry on SITS. N/MM only (After event)	JACS Code	Academic Team
Taught (Cert/Dip)	MM	Data Science Fundamentals	CETM24	30	Core		001 Coursework 30% 002 Coursework 30% 003 Coursework 40%		Prof. Yonghong Peng			1100	
	N	Technology Management for Organisations	CETM50	30	Core		001 Coursework 40% 002 Coursework 60%		Prof. Alastair Irons			1100	
	N	Data Science Product Development	CETM46	30	Core		001 Coursework 50% 002 Coursework 50%		Mr. Ming Jiang			1100	
	N	Machine Learning and Data Analytics	CETM47	30	Core		001 Coursework 50%		Dr. Valentina Plekhanova			1100	Dr. Valentina Plekhanova, Prof.

							002 Coursework 50%						Yonghong Peng
Masters	N	Computing Master's Project	PROM02	60	Core		001 Coursework 10%		Dr. David Nelson			1100	Dr David Nelson, Dr Sharon McDonald
							002 Coursework 60%						
							003 Viva + Coursework 30%						

APPENDIX 4 - Benchmark mapping – MSc Data Science

The [QAA benchmark](#) specifies the threshold standard of achievement, i.e. the standard expected to be achieved by a student graduating with the award of a master's degree in computing. The threshold level specifies:

7.2 All students graduating with a master's degree in computing are expected to be able to have demonstrated:

1. a systematic understanding of the knowledge of the domain of their programme of study, with depth being achieved in particular areas, including both foundations and issues at the forefront of the discipline and/or professional practice in the discipline; this should include an understanding of the role of these in contributing to the effective design, implementation and usability of relevant computer-based systems
2. a comprehensive understanding, and a critical awareness of: the essential principles and practices of the domain of the programme of study as well as current research and/or advanced scholarship; current standards, processes, principles of quality and the most appropriate software technologies to support the specialism; the relevance of these to the discipline and/or professional practice in the discipline; and an ability to apply these
3. consistently produced work which applies to and is informed by research and/or practice at the forefront of the developments in the domain of the programme of study; this should demonstrate critical evaluation of aspects of the domain, including appropriate software support, the ability to recognise opportunities for software or hardware tool use as well as possible tool improvement, an understanding of the importance of usability and effectiveness in computer systems development, and generally the acquisition of well-developed concepts
4. understanding of the professional, legal, social and ethical framework within which they would have to operate as professionals in their area of study; this includes being familiar with and being able to explain significant applications associated with their programme of study and being able to undertake continuing professional development as a self-directed lifelong learner across the elements of the discipline
5. the ability to apply the principles and practices of the particular programme's domain in tackling a significant domain related activity; the solution should demonstrate a sound justification for the approach adopted as well as originality (including exploration and investigation) and a self-critical evaluation of effectiveness but also critical awareness of current problems and new insights, and a sense of vision about the direction of developments in aspects of the domain of the programme.

The tables below provide a mapping of benchmark against the programme learning outcomes:

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
1	Y			Y	Y			Y		Y
2			Y	Y	Y	Y		Y	Y	
3	Y			Y			Y	Y	Y	
4		Y	Y			Y				
5			Y				Y	Y	Y	Y

	K1	K2	K3	K4	K5	K6	K7	K8	K9
1	Y	Y	Y	Y	Y	Y	Y		Y

2			Y	Y		Y	Y	Y	Y
3	Y	Y	Y					Y	Y
4					Y		Y		
5			Y					Y	Y