



PROGRAMME SPECIFICATION

KEY FACTS

| | |
|---------------------------------------|--|
| Programme name | Data Science (with Integrated Foundation Year) Data Science (with Integrated Foundation and Placement Year) |
| Award | MSci (Hons) |
| School | Science & Technology |
| Department or equivalent | Department of Computer Science |
| UCAS Code | G1DF |
| Programme code | USDASF |
| Type of study | Full Time |
| Total UK credits | 600 720 |
| Total ECTS | 300 360 |
| Partner (partnership programmes only) | None |
| Type of partnership | None |

PROGRAMME SUMMARY

The MSci in Data Science (with Integrated Foundation Year) will prepare you for a successful career as a data scientist with a strong theoretical and practical computer science background. Data Science (DS) is the area of work concerned with the extraction of actionable insight from large collections of data. The MSci in DS will develop both your programming, analysis and design expertise skills, as well as your specialist skills in data acquisition, information extraction, aggregation and representation, data analysis, knowledge extraction and explanation, which are all in high demand in the IT business, security and health sectors, intelligent transport, energy efficiency and the creative industries. Data-intensive processes where previously unrecognised patterns are discovered by analysing massive and mixed data sets have also started to reshape how scientific discovery and innovation takes place, making Data Science a core, indispensable scientific discipline.

The programme covers computer science starting with core foundational skills such as programming, and progressing to cover a range of computing topics with a focus on data science as a practice. The course covers the study and integration of advanced methods and techniques from knowledge representation and reasoning, statistical machine learning, high-performance computation, pattern recognition, service-oriented

computing, computer programming, data warehousing, and data visualisation. A 450 hour individual project will allow you to carry out an extended piece of work under the supervision of one of our specialist academic and research staff, at the cutting edge of data science, in an industrial or academic context and will enable you to specialise in an application area of data science working often on a real-world problem.

The MSci (Hons) in Data Science (with Integrated Foundation Year) is a full-time five-year Integrated Masters Programme. The programme consists of five Stages, each corresponding to an academic year. Programme Stage 0 is intended to bring you up to the same standard as students joining the main degree directly into the first year. The programme shares Programme Stage 1 and majority of Programme Stage 2 with the BSc (Hons)/MSci (Hons) Computer Science, MSci (Hons) in Computer Science with Cyber Security and MSci (Hons) in Computer Science with Games Technology and you can transfer to/from these programmes at the end of Stage 2. These transfers allow you to choose your final degree programme based on at least a year's experience of university study.

Each of the five stages of the programme consists of 120 credits:

- Programme Stage 0 consists core material in computing and mathematics with an additional course on employability.
- Programme Stage 1 develops the foundational material, including programming and databases.
- Programme Stage 2 consists of further compulsory core computer science subject matter and includes a 15-credit team project.
- You may elect to take an industrial placement between Programme Stage 2 and Programme Stage 3 or between Programme Stage 3 and Programme Stage 4.
- Programme Stage 3 consists of five core modules and three elective modules, allowing you to develop specialisms in the data science field drawing on the expertise of academic staff.
- Programme Stage 4 consists of four advanced core module, one elective and a large, 45-credit, individual project supervised by a member of academic staff.

Aims

This programme aims to prepare you with the knowledge, skills and values needed for a technical career as a data scientist by:

- equipping you with the breadth of knowledge, skills and techniques required by the data science profession,
- equipping you with the computer scientist's core skills in programming, software engineering, databases and mathematics
- developing your knowledge in specialised and advanced topics in data science,
- enabling you to work with and learn from active researchers in machine

- learning, high-performance computing and data visualization,
- enabling you to critically evaluate the technical, social and management dimensions of data-intensive systems and technologies
- experience of the planning, management and execution of a data-science project.

The programme provides you with a number of exit routes.

CERTIFICATE OF HIGHER EDUCATION IN COMPUTER SCIENCE The first exit route is for the Certificate of Higher Education in Computer Science which you are entitled to if you successfully complete Stage 1 of the programme, earning 120 level 4 credits.

All of you completing Stage 1 or the Certificate in Computer Science will be able to discuss underlying concepts and principles associated with computer science and relate these to problems arising in computer science. You will be able to express solutions to problems using the formalism introduced in Stage 1.

DIPLOMA OF HIGHER EDUCATION IN COMPUTER SCIENCE

The second exit route is for the Diploma of Higher Education in Computer Science, which you are entitled to if you have completed the Certificate in Higher Education and in addition you have successfully completed Stage 2 of the programme, earning 120 level 5 credits.

All of you completing Stage Two or the Diploma in Computer Science will build on your previous knowledge and experience to develop skills of enquiry in computer science and apply a variety of approaches to problem-solving as well as identify the limitations of your knowledge. You will be able to interpret open ended problems, apply your knowledge and skills to solve them and be able to write reports on your findings.

BSc (Hons) IN COMPUTER SCIENCE WITH DATA SCIENCE

The third exit route is the BSc (Hons) in Computer Science with Data Science, which you are entitled to if you have completed the Diploma in Higher Education and in addition you have successfully completed Stage 3 of the programme, earning a further 120 credits, 90 of which at level 6, the rest at level 5 or level 6.

All of you completing the BSc (Hons) in Computer Science with Data Science will, through core and elective modules, further develop a coherent systematic, detailed knowledge of computer science and data science. You will be able to evaluate solutions to computer science and data science related problems, assess current techniques for designing and developing solutions to computer science/data science problems and argue for your solutions using research and scholarship demonstrating your role as a reflective practitioner.

MSci (Hons) IN DATA SCIENCE

You are entitled to the MSci (Hons) in Data Science, if you have completed the BSc (Hons) and in addition you have successfully completed Stage 4 of the programme, earning 120 level 7 credits.

All of you completing the MSci (Hons) in Data Science will choose, through core and elective modules, to explore some areas of data science further to broaden your expertise and skills. In addition to the above you will have demonstrated original application of knowledge in the area, either through the analysis, design, and evaluation of a data science artefact, the design and implementation of a data science solution, or the critical evaluation and extension of the knowledge in the area through a research-led project, which can involve the development of software artefacts as well.

If you are on this course and do not fulfil the progression criteria to progress to Programme Stage 3, you will be transferred to one of the other BSc courses within the Department of Computer Science upon discussion with the course directors.

WHAT WILL I BE EXPECTED TO ACHIEVE?

On successful completion of this programme, you will be expected to be able to:

Knowledge and understanding:

- demonstrate the ability to use data science methods and techniques (e.g. in data analysis, pattern recognition and machine learning, high-performance computing, knowledge extraction, visual analytics)
- analyse and solve problems and develop innovative solutions, processing real data, designing and implementing big data methods and tools, selecting, applying and evaluating big data techniques
- explain the concepts of computer programming and data analysis methodologies
- use and explain the theory of computer science
- review and critically evaluate the literature and current developments and challenges in data science, such as designing distributed solutions or efficient learning algorithms
- identifying and managing scientific and technical risks and uncertainty associated with data science and its applications
- explain legal issues relating to computing: intellectual property, data protection, computer misuse and health and safety

Skills:

- analyse, develop and select robust algorithms and tools that can handle uncertainty and large amounts of data
- design, develop, adapt and critically evaluate data science computer algorithms and systems
- use the latest hardware and software technologies to create high-performance systems with a high level of capacity
- design and use data visualization tools both to perform human-empowered explorative analysis and to also communicate findings effectively to technical and non-technical audiences

- analyse and solve problems based on theoretical considerations, and develop innovative solutions, taking into account user needs and constraints
- plan and manage a large scale individual problem solving computing project
- collaborate in working teams
- engage in critical peer review process of papers, software and proposals, and give positive advice for improvement and innovation
- analyse, evaluate and act upon descriptive documents

Values and attitudes:

- understand and propose means to consider professional, social, cultural and ethical issues related to data analysis in the context of the scientific process
- embrace technical challenges as an opportunity for personal development
- rationally exploit both traditional and novel technological approaches
- rigorously assess alternative approaches and novel designs and implementations
- define a technical goal and encourage and lead others in order to achieve it
- gain skills about professional ethics and privacy in the context of data protection
- assess the nature of intellectual property and its ownership, and respect it accordingly

This programme has been developed in accordance with the QAA Subject benchmark statements for Computing at Bachelor's and Master's level (2007, 2011).

HOW WILL I LEARN?

The teaching and learning methods used are such that the levels of both specialisation of content and autonomy of learning increase as you progress through the programme. This is reflected in the programme structure: fundamental concepts and skills are addressed first, followed by core knowledge that builds on these fundamentals, which in turn prepares students for advanced Data Science focused electives and a large individual project in Stage 3 and 4. This progression will be guided by active researchers in Computer Science and in particular those in Machine Learning, Pattern Recognition, Data Visualization, and High Performance Computing, with the culminating individual project conducted largely independently with appropriate academic supervision and, where appropriate, in collaboration with industrial partners.

The programme is delivered and assessed via a coordinated combination of: lectures (including programmed student activity); supervised tutorials; supervised laboratory work; independent coursework; group project work; and individual project work.

The standard format is that taught modules are delivered through a series of 20 hours of lectures and 10 hours of tutorials/laboratory sessions. Lectures are normally used to:

- (a) present and explain the theoretical concepts underpinning a particular subject;
- (b) highlight the most significant aspects of a module's syllabus; and
- (c) indicate additional topics and resources for private study.

Tutorials are used to help you develop skills in applying the concepts covered in the lectures of the relevant module, normally in practical problem solving contexts. Laboratory sessions serve a similar purpose as the tutorials but their strategy is to demonstrate application of concepts and techniques through the use of state-of-the-art software development tools and environments.

You are expected to undertake independent study, including substantial coursework assignments for each module, which will be spent working on background reading, revision of notes, work on tutorial problems, coursework and individual or group work on projects.

The coursework takes many forms, including programs, theoretical work, and essays, and is primarily formative.

Project work plays an important part in computing undergraduate programmes. The Team Project provides students with experience of the issues involved in software development projects as well as enhancing team-working and related transferrable skills.

In the Individual Project students are expected to carry an independent investigation of a significant computing problem allowing them to apply what they learnt through the programme. This activity is carried out under the supervision of academic staff, offered through a series of supervision sessions.

The individual project is a substantial task that develops a research related topic and is performed under the supervision of academic staff. The assessment of projects relies on a project report. During the project, you will be given an opportunity to solve a real world problem or develop techniques that primarily involves the analysis of using complex data from industry, academia or government, e.g. collecting and processing real data, designing and implementing data analysis methods and tools, applying and evaluating big data, machine learning and visualisation techniques to solve a real problem, e.g. in the areas of security, health, transport, energy, retail, online learning, or the creative industries.

In addition to lecture, laboratory and tutorial support, the programme is supported by City's Moodle learning environment, which provides resources on each of the modules. This includes materials such as lecture notes and lab sheets, as well as interactive components, such as quizzes or discussion forums.

Elective placements and the workplace learning opportunities are available to all students. A professional placement and career development module supported by visits from a Work-based Learning Advisor, ensures that students are able to identify learning opportunities that will enable them to attain and demonstrate competence in a work role; these opportunities arise naturally from workplace tasks, others are provided by negotiation focussed on the students career and development plan.

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessment and Assessment Criteria

Most modules are assessed with examinations and coursework. Details can be found in the individual module specifications. Typically, modules are mainly assessed through written examination, and coursework also contributes to module assessment. The written examinations will contain theoretical questions, including mathematical aspects, as well as writing and analysing small amounts of code and small essays on the applications of computational techniques. As you move over to the more specialised modules as part of your Programme Stage-3 and Programme Stage-4, you will be expected to demonstrate how well you can synthesise various pieces of knowledge and be also assessed on how well you can critically reflect on the solutions you are suggesting.

Coursework takes many forms, including programs, modelling, theoretical work, and essays. In some modules you will also be required to present your work.

Project work plays an important part in computing undergraduate programmes. In the 15 credit Team Project you will be working in a group to design and develop a software product. For the 45 credit Individual Project, you are expected to carry out an independent investigation of a significant data science problem applying the knowledge and skills you have acquired through the programme, under the supervision of academic staff.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade-Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order to achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.

Feedback on assessment

Feedback will be provided in line with our Assessment and Feedback Policy. In particular, you will normally be provided with feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. For end of module examinations or an equivalent significant task (e.g. an end of module project), feedback will normally be provided within four weeks. The timescale for feedback on final year projects or dissertations may be longer. The full policy can be found at:

http://www.city.ac.uk/_data/assets/word_doc/0003/69249/s19.doc

Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits. You also need to pass each Programme Stage of your Programme

in order to progress to the following Programme Stage.

Year 0 will not contribute to your overall aggregate mark. There is however a minimum overall average mark of 60% that is required to progress from year 0 to year 1. For programme stage zero the pass mark for each module is 50%.

The Pass mark for each module in Programme Stages 1, 2 and 3 is 40%, and the pass mark for each module in Programme Stage 4 is 50%.

If you fail an assessment component or a module, the following will apply:

1. Compensation: where you fail up to a total of 20 credits of a Stage at first or resit attempt, you may be allowed compensation if:
 - Compensation is permitted for the module involved (see the module specification), and
 - It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Stage, and
 - A minimum overall mark of no more than 10 percentage points below the module pass mark has been achieved in the module to be compensated, and
 - An aggregate mark of 40% (50% at Stage 4) has been achieved for the Stage.

Where you are eligible for compensation at the first attempt, this will be applied in the first instance rather than offering a resit opportunity.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original module mark will be used for the purpose of your Award calculation.

2. Resit: Where you are not eligible for compensation at the first attempt, you will be offered one resit attempt.

If you are successful in the resit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a resit will be capped at the pass mark for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the components that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your resit by the date specified you will not progress to the next Programme Stage and the Assessment Board will require you to be withdrawn from the Programme.

If you fail to meet the requirements for a particular Programme Stage or the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per the table below.

The Programme has minimum attendance requirements for designated teaching and learning events for each Stage. Students failing to meet these requirements may be subject to withdrawal from the programme.

If you would like to know more about the way in which assessment works at City, please see the full version of the Assessment Regulations at:
http://www.city.ac.uk/_data/assets/word_doc/0003/69249/s19.doc

WHAT AWARD CAN I GET?

Master of Science with Honours:

For students completing the four-year programme, your overall aggregate mark will be calculated by combining the aggregate marks from Programme Stages 2, 3 and 4 with weightings 20%, 40% and 40% respectively.

| Programme Stage | HE Level | Credits | Weighting (%) | Class | % required |
|-----------------|----------|---------|---------------|-------------------|------------|
| 0 | 3 | 120 | 0 | I | 70 |
| 1 | 4 | 120 | 0 | II upper division | 60 |
| 2 | 5 | 120 | 20 | II lower division | 50 |
| 3 | 6 | 120 | 40 | III | 40 |
| 4 | 7 | 120 | 40 | | |

Master of Science with Honours (with placement after Programme Stage 2):

| Programme Stage | HE Level | Credits | Weighting (%) | Class | % required |
|-----------------|----------|---------|---------------|-------------------|------------|
| 0 | 3 | 120 | 0 | I | 70 |
| 1 | 4 | 120 | 0 | II upper division | 60 |
| 2 | 5 | 120 | 20 | II lower division | 50 |
| Placement | 6 | 120 | 10 | III | 40 |
| 3 | 6 | 120 | 35 | | |
| 4 | 7 | 120 | 35 | | |

Master of Science with Honours (with placement after Programme Stage 3):

| Programme Stage | HE Level | Credits | Weighting (%) | Class | % required |
|-----------------|----------|---------|---------------|-------------------|------------|
| 0 | 3 | 120 | 0 | I | 70 |
| 1 | 4 | 120 | 0 | II upper division | 60 |
| 2 | 5 | 120 | 20 | II lower division | 50 |
| 3 | 6 | 120 | 35 | III | 40 |
| Placement | 6 | 120 | 10 | | |
| 4 | 7 | 120 | 35 | | |

In addition 480 credits must be achieved excluding IN3053.

Bachelor of Science with Honours:

For students completing the three-year programme, your overall aggregate mark will be calculated by combining the aggregate marks from Programme Stages 2 and 3 with weightings 40% and 60% respectively.

| Programme Stage | HE Level | Credits | Weighting (%) |
|-----------------|----------|---------|---------------|
| 0 | 3 | 120 | 0 |
| 1 | 4 | 120 | 0 |
| 2 | 5 | 120 | 40 |
| 3 | 6 | 120 | 60 |

Class **% required**

| | |
|-------------------|----|
| I | 70 |
| II upper division | 60 |
| II lower division | 50 |

Bachelor of Science with Honours (with placement):

| Programme Stage | HE Level | Credits | Weighting (%) |
|-----------------|----------|---------|---------------|
| 0 | 3 | 120 | 0 |
| 1 | 4 | 120 | 0 |
| 2 | 5 | 120 | 40 |
| Placement | 6 | 120 | 10 |
| 3 | 6 | 120 | 50 |

Class **% required**

| | |
|-------------------|----|
| I | 70 |
| II upper division | 60 |
| II lower division | 50 |

Diploma of Higher Education:

| Programme Stage | HE Level | Credits | Weighting (%) |
|-----------------|----------|---------|---------------|
| 0 | 3 | 120 | 0 |
| 1 | 4 | 120 | 35 |
| 2 | 5 | 120 | 65 |

Class **% required**

| | |
|------------------|----|
| With Distinction | 70 |
| With Merit | 60 |

Certificate of Higher Education:

| Programme Stage | HE Level | Credits | Weighting (%) |
|-----------------|----------|---------|---------------|
| 0 | 3 | 120 | 0 |
| 1 | 4 | 120 | 100 |

Class **% required**

| | |
|------------------------|----|
| With Distinction | 70 |
| With Merit | 60 |
| Without Classification | 40 |

WHAT WILL I STUDY?

Programme Stage 0

To pass Programme Stage 0 you must have acquired 120 credits at level HE3 as specified in the programme scheme. To progress from Programme Stage 0 to Programme Stage 1 of the degree, the Foundation Year requirements must have been satisfied. In particular, as stated above, a minimum overall year 0 average of 60% must be achieved.

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Can be compensated? | Level |
|--|-----------|----------------|----------------------------|---------------------|-------|
| Introduction to Programming with Python | IN0011 | 15 | Core | N | 3 |
| Web Development | IN0012 | 15 | Core | N | 3 |
| Computer Fundamentals | IN0013 | 15 | Core | N | 3 |
| Discrete Mathematics | MA0007 | 15 | Core | N | 3 |
| Introduction to Probability and Statistics | MA0009 | 15 | Core | N | 3 |
| Employability and Transferable Skills | IN0014 | 15 | Core | N | 3 |
| Advanced Programming with Python | IN0009 | 15 | Core | N | 3 |
| Group Project | IN0010 | 15 | Core | N | 3 |

Programme Stage 1

To pass Stage 1, an Honours degree student must have acquired 120 credits as specified in Stage 1 of the Programme Scheme.

This Programme Stage consists of 5 compulsory modules, worth 15 credits each, and 2 core modules, worth a total of 45 credits.

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Compensation Yes/No | Level |
|----------------------------|-----------|----------------|----------------------------|---------------------|-------|
| Introduction to Algorithms | IN1002 | 15 | Compulsory | Y | 4 |
| Mathematics for Computing | IN1004 | 15 | Compulsory | Y | 4 |
| Systems Architecture | IN1006 | 15 | Compulsory | Y | 4 |
| Programming in Java | IN1007 | 30 | Core | N | 4 |
| Databases | IN1013 | 15 | Core | N | 4 |
| Operating Systems | IN1011 | 15 | Compulsory | Y | 4 |

| | | | | | |
|------------------------------------|--------|----|------------|---|---|
| Computer Science, Ethics & Society | IN1012 | 15 | Compulsory | Y | 4 |
|------------------------------------|--------|----|------------|---|---|

Programme Stage 2

To pass Stage 2, an Honours degree student must have acquired 120 credits as specified in Stage 2 of the Programme Scheme. For an Honours degree student to progress from Stage 2 to Stage 3, Stage 2 requirements must have been satisfied.

This Programme Stage consists of 6 compulsory modules, each worth 15 credits, and 2 core modules, including a project module, which are worth 15 credits each.

You may transfer into this programme route at the start of Programme Stage 2 if:

- you have passed the modules in Programme Stage 1;
- resources allow the transfer;
- the programme director approves the transfer.

A student registered on the MSci programme who obtains the required credits for Programme Stage 2 but does not achieve an aggregate mark of at least 55% at Programme Stage 2 will be transferred to the related BSc programme.

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Compensation Yes/No | Level |
|---|-----------|----------------|----------------------------|---------------------|-------|
| Data Structures and Algorithms | IN2002 | 15 | Compulsory | Y | 5 |
| Language Processors | IN2009 | 15 | Compulsory | Y | 5 |
| Computer Networks | IN2011 | 15 | Compulsory | Y | 5 |
| Object-Oriented Analysis and Design | IN2013 | 15 | Compulsory | Y | 5 |
| Professional Development in IT | IN2015 | 15 | Core | N | 5 |
| Team Project | IN2033 | 15 | Core | N | 5 |
| Programming in C++ | IN2029 | 15 | Compulsory | Y | 5 |
| Accenture School of Tech: Building Skills in Tech Transformation, Cloud and Consultancy | IN2032 | 15 | Compulsory | Y | 5 |

Programme Stage 3

To progress from Programme Stage 2 to Programme Stage 3 on the MSci (Hons) programme, Programme Stage 2 requirements must have been satisfied, and in addition an overall aggregate of 55% achieved at Programme Stage 2. If the Programme Stage 2 requirements are met, but the 55% aggregate grade is not achieved, then you would be

transferred to Programme Stage 3 on the BSc (Hons) programme.

To pass Programme Stage 3, you must have acquired 120 credits, excluding credits acquired for the elective module IN3053, as specified in Programme Stage 3 of the Programme Scheme.

This Programme Stage consists of 3 compulsory modules, each worth 15 credits, and 5 elective modules each worth 15 credits. Elective choice may be further constrained by timetabling requirements. The full range of electives may not be available in all years.

Note on *super-modules*:

- For *super-modules*, i.e. modules with identical titles (but differing module codes) offered at both Level 6 and Level 7, only one of these modules may be chosen.
- In these module pairs, the differences are primarily within the learning outcomes (Knowledge and Understanding and Skills) and how they are assessed. The learning activities and assessment will be aligned accordingly to reflect these differences.

You may transfer into this programme route at the start of Programme Stage 3 if:

- you have passed the modules in Programme Stage 2, with an overall aggregate mark of 55%;
- resources allow the transfer;
- the programme director approves the transfer.

If you leave the programme at the end of Programme Stage 3 you may elect to additionally take IN3007 (the Level 6 project) in order to gain professional recognition.

A student registered on the MSci programme who obtains the required credits for Programme Stage 3 but does not achieve an aggregate mark of at least 50% at Programme Stage 3 will not be able to proceed to Programme Stage 4. The Assessment Board will consider whether the student has met the requirements for a BSc Award.

Elective choice may be constrained by timetabling requirements. The full range of electives may not be available in all years.

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Compensation Yes/No | Level |
|----------------------------|------------------|-----------------------|-----------------------------------|----------------------------|--------------|
| Computer Vision | IN3060 | 15 | Compulsory | Y | 6 |
| Principles of Data Science | IN3061 | 15 | Compulsory | Y | 6 |
| Introduction to AI | IN3062 | 15 | Compulsory | Y | 6 |
| Games Technology | IN2026 | 15 | E | Y | 5 |
| Advanced Databases | IN3001 | 15 | E | Y | 6 |

| | | | | | |
|---|--------|----|---|---|---|
| Theory of Computation | IN3017 | 15 | E | Y | 6 |
| Advanced Games Technology | IN3026 | 15 | E | Y | 6 |
| Data Visualization | IN3030 | 15 | E | Y | 6 |
| Digital Signal Processing and Audio Programming | IN3031 | 15 | E | Y | 6 |
| Advanced Programming: Concurrency | IN3042 | 15 | E | Y | 6 |
| Functional Programming | IN3043 | 15 | E | Y | 6 |
| Natural Language Processing | IN3045 | 15 | E | Y | 6 |
| Cloud Computing | IN3046 | 15 | E | Y | 6 |
| Information Security Fundamentals | IN3049 | 15 | E | Y | 6 |
| Programming and Mathematics for AI | IN3063 | 15 | E | Y | 6 |
| Agents and Multi Agents Systems | IN3064 | 15 | E | Y | 6 |
| User Centred Systems | IN3065 | 15 | E | Y | 6 |
| Semantic Web Technologies and Knowledge Graphs | IN3067 | 15 | E | Y | 6 |
| Hewlett Packard Enterprise: Technology Consulting | IN3052 | 15 | E | Y | 6 |
| Web Development | IN3050 | 15 | E | Y | 6 |
| Information Retrieval | IN3066 | 15 | E | Y | 6 |

With Placement:

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Compensation Yes/No | Level |
|---|-----------|----------------|----------------------------|---------------------|-------|
| Professional Placement & Career Development | IN3053 | 120 | Core | N | 6 |

Programme Stage 4

For an MSci (Honours) degree student to progress from Programme Stage 3 to Programme Stage 4, Programme Stage 3 requirements must have been satisfied, and in addition an overall aggregate of 50% achieved at Programme Stage 3.

To pass Stage 4, the student must have acquired 120 credits as specified in Stage 4 of the Programme Scheme.

This Programme Stage consists of 2 compulsory core modules each worth 15 credits; and 3 elective modules (2 computer science electives and 1 data science elective), each worth 15 credits; and a compulsory core project worth 45 credits.

Elective choice may be constrained by timetabling requirements. The full range of electives may not be available in all years

| Module Title | SITS Code | Module Credits | Core/ Compulsory/ Elective | Compensation Yes/No | Level |
|---|------------------|-----------------------|-----------------------------------|----------------------------|--------------|
| Machine Learning | INM431 | 15 | Compulsory | Y | 7 |
| Visual Analytics | INM433 | 15 | Compulsory | Y | 7 |
| Individual Project | INM450 | 45 | Core | N | 7 |
| Information Retrieval | INM305 | 15 | E | Y | 7 |
| Software Systems Design | INM330 | 15 | E | Y | 7 |
| User-Centred System Design | INM355 | 15 | E | Y | 7 |
| Advanced Databases | INM370 | 15 | E | Y | 7 |
| Project Management | INM372 | 15 | E | Y | 7 |
| Digital Signal Processing and Audio Programming | INM378 | 15 | E | Y | 7 |
| Data Visualisation | INM402 | 15 | E | Y | 7 |
| Advanced Programming: Concurrency | INM420 | 15 | E | Y | 7 |
| Advanced Algorithms and Data Structures | INM422 | 15 | E | Y | 7 |
| Neural Computing | INM427 | 15 | E (DS) | Y | 7 |
| Cloud Computing | INM429 | 15 | E | Y | 7 |
| Big Data | INM432 | 15 | E (DS) | Y | 7 |
| Natural Language Processing | INM434 | 15 | E | Y | 7 |
| Information Security Fundamentals | INM440 | 15 | E | Y | 7 |
| Programming and Mathematics for Artificial Intelligence | INM702 | 15 | E | Y | 7 |
| Computational Cognitive Systems | INM703 | 15 | E | Y | 7 |
| Agents and Multi Agents Systems | INM704 | 15 | E | Y | 7 |
| Advanced Games Technology | INM710 | 15 | E | Y | 7 |
| Web Development | INM428 | 15 | E | Y | 7 |

TO WHAT KIND OF CAREER MIGHT I GO ON?

When you graduate with the MSci (Hons) in Data Science you would be expected to achieve employment as data scientists in a range of businesses, from health to retail, or in government. The emphasis of this programme on areas that City has renowned research expertise, machine learning and visual analytics, and City's internships and links with many industrial partners will particularly enable students to gain appointments as specialists in data science, data analysis and visualization in the security, health, transport and energy sectors, the creative industries, and a host of organisations within Tech City.

Graduates starting a new business can benefit from City's London City Incubator and City's links to Tech City, providing support for start-up businesses. If you would like more information on the Careers support available at City, please go to:

<http://www.city.ac.uk/careers/for-students-and-recent-graduates>.

WHAT STUDY ABROAD OPTIONS ARE AVAILABLE?

There are no study abroad options for the programme.

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

You will have the opportunity to undertake a one-year placement during your programme. You will be given the opportunity to secure a role in a diverse range of companies from multinational organisations to small and medium sized (SMEs) including dynamic startup ventures both in the UK and internationally. The broad spectrum of roles available will enable you to focus on your interests whilst being exposed to new experiences and challenges.

The one year placement can be undertaken following successful completion of Programme Stage 3 and will be required to last for a minimum of 9 months.

The following criteria apply to placements:

In order to join a placement route, you must successfully complete the preceding academic year.

Your placement should be approved by the Corporate Relations & Employability Unit (CREU).

You will need to source and apply for any placement opportunities independently however support and guidance will be provided throughout the application process by the CREU.

The placement year will be worth 120 credits and weighted at 10% of your final degree grade. Your placement grade will be based on the grades achieved on successful completion of IN3053 Professional Placement & Career Development module.

WILL I GET ANY PROFESSIONAL RECOGNITION?

Accrediting Body: BCS, The Chartered Institute for IT

Nature of Accreditation

In order to gain accreditation you must successfully complete the 480 credits of the MSci programme, including passing at the first attempt a practical problem solving project. In particular, leaving the programme after 3 year whilst earning and honours degree will not gain accreditation.

Partial CEng accreditation

Certificate

Diploma

Professional Graduate Diploma

PGD Project

HOW DO I ENTER THE PROGRAMME?

The Foundation Year is designed as an entry route for students who were unable to obtain the required A Level grades to access the corresponding BSc programme directly.

Our standard offer for MSci Data Science (with Integrated Foundation Year) is CCC at A-Level.

In addition, GCSE English Language grade 4 and GCSE Mathematics grade 5 is required.

Each application is treated on its own merit. This is to allow us to weight in work experience, personal statements, and other factors, as and when appropriate.

Scholarships

Details of scholarships available to new undergraduate students can be found on the University's website at

<http://www.city.ac.uk/study/why-study-at-city/fees-and-finance/scholarships>

Version: 5.1

Version date: April 2025

For use from: 2025/26