Goldsmiths
UNIVERSITY OF LONDON

MSc Data Science
Programme Specification

Awarding Institution:
University of London (Interim Exit Awards made by Goldsmiths' College)
Teaching Institution: Goldsmiths, University of London
Final Award:
Programme Name:
MSc Data Science
MSc Data Science and Artificial Intelligence
Total credit value for programme: 180
Name of Interim Exit Award(s):n
Postgraduate Certificate in Data Science
Postgraduate Certificate in Data Science and AI
Postgraduate Diploma in Data Science
Postgraduate Diploma in Data Science and AI
Duration of Programme: 1 year full-time or 2-3 years part-time
UCAS Code(s): Not applicable
HECoS Code(s):
(100366) Computer Science
(100406) Statistics
QAA Benchmark Group: Computing/Business and Management
FHEQ Level of Award: Level 7
Programme accredited by: Not applicable
Date Programme Specification last updated/approved: February 2023
Home Department: Computing
Department(s) which will also be involved in teaching part of the programme:
Institute of Management Studies

Programmes overview

Data analytic techniques are evolving fast, new data is being produced at an unprecedented rate across the world and the tools we use to process it are becoming more intelligent. This programme will equip the students with the necessary skills to become a leading data science specialist in our modern society. Students will gain the theoretical and computational skills needed to extract insights from data and to conduct data analysis in a

wide range of applications. Students can register for the general Data Science pathway or choose the specialist pathway for Artificial Intelligence.

Programme aims

These innovative programmes will provide students with the technical and practical skills to analyse the data that is key to success in future business, digital media, and science. Students will gain:

- a firm grounding in the theory of data mining, statistics, and machine learning
- hands-on experience of real-world applications, such as social media, biomedical data and financial data and
- the opportunity to work with industry standard software tools.

Meeting Employer Need:

London has the highest number of AI suppliers in Europe and a wide range of employers and industries that could benefit from AI systems. Collaboration to develop a strong supply of suitably skilled graduates is vital to London's ability to continue to grow and is a key part of the mayor's planning. Research into the needs of employers for AI related roles indicates that the common skills required are programming skills (knowledge of Python/C++), algorithms and Deep Learning Frameworks. Employers also emphasise the need for business awareness and communication skills. For example, Cap Gemini are currently recruiting AI Engineers and are looking to bring in people at all levels and take applicants that have two or three skills from their long list. GSK is recruiting for a Machine Learning Engineer and asking for an expert understanding of Python with experience of at least one Deep Learning Framework. Aside from specific skills which employers are recruiting for, we are also aware through our industry engagement work undertaken that in London, many employers in AI are seeking flexible learning schemes where up-skilling and retaining staff is a priority. Our delivery method would address this gap and requirement directly.

Programme entry requirements

Students will gain a strong foundation in data science and specialist knowledge in a particular field. We do not assume that students have programmed before, but we do require a level of mathematical dexterity that is commensurate with having completed a numerate degree.

A BA or BSc Degree at 2.1 level or above. For the Data Science, Data Science & AI, Data Science & FinTech pathways the degree should be in subjects like computer science, mathematics, statistics, engineering, or quantitative subjects like economics/finance. For the Data Science & Econometrics and Data Science & Marketing pathways in addition to the

degrees mentioned, the degree could be in a subject related to management, business, or marketing.

Non-native English students should normally have a minimum IELTS score of 6.5 or equivalent.

Programme learning outcomes

Students who successfully complete any pathway in the Postgraduate Certificate will demonstrate:

PGCert

Knowledge and understanding

Code	Learning outcome	Taught by the following module(s)
A1	Explain and critically assess a range of machine learning and statistical data mining techniques used in data analytics and in other related areas.	Compulsory modules.
A2	Compare and critically contrast practical and theoretical contexts in which data scientists work.	Optional Modules.
A3	Understanding the social impact of Data Science on society.	Compulsory modules.
A4	Understand social and ethical facets of data science that includes human and legal implications of data science and the impact of the algorithms on transparency, bias, discrimination/fairness, and accountability.	Compulsory modules.
A5	Be able to design human-centric solution workflows and pipelines.	Compulsory modules.
A6	**PGCert Data Science and AI only**: Explain and critically assess a range of artificial intelligence techniques and the context of their use.	Compulsory modules.

Cognitive and thinking skills

Code	Learning outcome	Taught by the following module(s)

B1	Critically evaluate emerging data analysis technologies and assess how it can be applied to different types and amounts of data.	Compulsory modules.

Subject specific skills and professional behaviours and attitudes

Code	Learning outcome	Taught by the following module(s)
C1	Critically analyse the application of technology to a range of real-world problems particularly in industry and interdisciplinary research.	Compulsory modules.
C2	Apply advanced skills and research-led specialist knowledge in the areas of machine learning and statistics to the design of software and data analyses.	Optional Modules.
C3	Design and program sufficiently complex computer software and data products.	Data Programming; Optional Modules.
C4	**PGCert Data Science and AI only**: Critically analyse the application of artificial intelligence to a range of real-world problems particularly in industry and interdisciplinary research.	Compulsory modules.

Transferable skills (Elements)

Code	Learning outcome	Taught by the following module(s)
D1	Communicate effectively, both in writing and in presentations to an audience.	This will be taught throughout the programme.
D2	Work effectively in groups.	This will be taught throughout the programme.
D3	Take responsibility for, plan and execute independent project work.	This will be taught throughout the programme.

PGDip

In addition to the learning outcomes for the PGCert, students who successfully complete the Postgraduate Diploma (for all the pathways) will demonstrate:

Cognitive and thinking skills

Code	Learning outcome	Taught by the following module(s)

B2	Analyse in depth how data analysis techniques can be applied to a range of interdisciplinary research areas.	Data Science Research Topics; Option Modules.
B3	**PGDip Data Science and AI only**: Analyse in depth how Artificial Intelligence techniques can be applied to a range of interdisciplinary research areas.	Compulsory modules; Option Modules.

Subject specific skills and professional behaviours and attitudes

Code	Learning outcome	Taught by the following module(s)
C5	**PGDip Data Science and AI only**: Demonstrate a deep understanding of cutting-edge artificial intelligence in the creation of a substantial commercially and/or research-wise relevant project.	Option Modules.

Transferable skills

Code	Learning outcome	Taught by the following module(s)
D4	Be able to do academic research and writing and present themselves and their work.	Data Science Research Topics, Final Project.
D5	Be able to reflect on and evaluate their work.	This will be taught throughout the programme
D6	Be able to work effectively in groups.	This will be taught in group projects which will be part of the assessment in modules including Machine Learning and Statistical Data Mining, and Big Data Applications.
D7	Be able to work effectively in groups.	All taught modules.

MSc

Additional learning outcomes for the MSc (all the pathways):

Subject specific skills and professional behaviours and attitudes

Code	Learning outcome	Taught by the following module(s)

C6	Propose, plan, execute and evaluate a significant piece of original Data Science work.	Final Project.
C7	Demonstrate a deep understanding of cutting-edge technologies in the creation of a substantial commercially and/or research-wise relevant project.	Final Project.
C8	**MSc Data Science and AI only**: Demonstrate a deep understanding of cutting-edge Artificial Intelligence techniques in the creation of a substantial commercially and/or research-wise relevant project.	Final Project.

Transferable skills

Code	Learning outcome	Taught by the following module(s)
D8	Be able to do academic research and writing and present themselves and their work.	Data Science Research Topics; Final Project.
D9	Be able to reflect on and evaluate their work.	This will be taught throughout the programme.
D10	Be able to work effectively in groups.	This will be taught in group projects which will be part of the assessment in modules including Machine Learning and Statistical Data Mining, and Big Data Applications.
D11	Be proactive, plan their activity in advance, and exercise personal responsibility in their work.	This will be taught in throughout the programme.

Mode of study

On Campus

Programme structure

MSc Data Science consists of two terms of taught modules followed by a large-scale project. The taught modules introduce you to fundamental mathematical and computational skills and show you how to apply them to real world data.

The programme includes:

- A firm grounding in the theory of data mining, statistics and machine learning.
- Hands-on practical real-world applications such as social media, biomedical data and financial data with Hadoop (used by Yahoo!, Facebook, Google, Twitter, LinkedIn, IBM, Amazon, and many others), R and other specialised software.
- The opportunity to work with real-world software such as Apache.
- Modules related to finance, economics, marketing and AI enhance the subject knowledge and expertise in the domains that are associated to the pathways.

In additional to the compulsory programme modules, students choose 3 optional modules from the indicative list (revised each year) below.

MSc Data Science

Full-time mode

Module Title	Module Code	Credits	Level	Module Status	Term
Data Programming	IS71068B	15	7	Compulsory	1
Machine Learning	IS71071B	15	7	Compulsory	2
Big Data Analysis	IS71059C	15	7	Compulsory	2
Statistics and Statistical Data Mining	IS71104B	15	7	Compulsory	1
Data Science Research Topics	IS71058B	15	7	Compulsory	1
Data Visualisation	IS71082C	15	7	Compulsory	1
Two 15 credit optional modules totalling 30 credits from a list that is updated every year	Various	30	7	Optional	1 & 2
Final Project in Data Science	IS71061B	60	7	Compulsory	3

Part-time mode

Academic year of study 1

Module Title	Module Code	Credits	Level	Module Status	Term
Statistics and Statistical Data Mining	IS71104B	15	7	Compulsory	1
Data Programming	IS71068B	15	7	Compulsory	1
Machine Learning	IS71071B	15	7	Compulsory	2
Big Data Analysis	IS71059C	15	7	Compulsory	2

Academic year of study 2

Module Title	Module Code	Credits	Level	Module Status	Term
Final Project in Data Science [*]	IS71061B	60	7	Compulsory	3
Data Science Research Topics	IS71058B	15	7	Compulsory	1
Data Visualisation	IS71082C	15	7	Compulsory	1
Two 15 credit optional modules totalling 30 credits from a list that is updated every year	Various	30	7	Optional	1 & 2

[*] Students doing the 3-year part-time mode will do the Final Project (60 credits) in their final year.

MSc Data Science and Artificial Intelligence

Full-time mode

Module Title	Module Code	Credits	Level	Module Status	Term
Data Programming	IS71068B	15	7	Compulsory	1
Machine Learning	IS71071B	15	7	Compulsory	2
Artificial Intelligence	IS71039B	15	7	Compulsory	1
Statistics and Statistical Data Mining	IS71104B	15	7	Compulsory	1
Data Science Research Topics	IS71058B	15	7	Compulsory	1
Neural Networks	IS71040A	15	7	Compulsory	2
Two 15 credit optional modules totalling 30 credits from a list that is updated every year	Various	30	7	Optional	1 & 2
Final Project in Data Science	IS71061B	60	7	Compulsory	3

Part-time mode

Academic year of study 1

Module Title	Module Code	Credits	Level	Module Status	Term
Statistics and Statistical Data Mining	IS71104B	15	7	Compulsory	1

Module Title	Module Code	Credits	Level	Module Status	Term
Data Programming	IS71068B	15	7	Compulsory	1
Machine Learning	IS71071B	15	7	Compulsory	2
Neural Networks	IS71040B	15	7	Compulsory	2

Academic year of study 2

Module Title	Module Code	Credits	Level	Module Status	Term
Final Project in Data Science [*]	IS71061B	60	7	Compulsory	3
Data Science Research Topics	IS71058B	15	7	Compulsory	1
Artificial Intelligence	IS71039B	15	7	Compulsory	1
Two 15 credit optional modules totalling 30 credits from a list that is updated every year	Various	30	7	Optional	1 & 2

[*] Students doing the 3-year part-time mode will do the Final Project (60 credits) in their final year.

Academic support

Support for learning and wellbeing is provided in a number of ways by departments and College support services who work collaboratively to ensure students get the right help to reach their best potential both academically and personally.

All students are allocated a Personal Tutor who has overall responsibility for their individual progress and welfare. Personal Tutors meet with their student at least twice a year either face-to-face, as part of a group and/or electronically. The first meeting normally takes place within the first few weeks of the autumn term. Personal Tutors are also available to students throughout the year of study. These meetings aim to discuss progress on modules, discussion of the academic discipline and reports from previous years if available (for continuing students). This provides an opportunity for progress, attendance and assessment marks to be reviewed and an informed discussion to take place about how to strengthen individual learning and success.

All students are also allocated a Senior Tutor to enable them to speak to an experienced academic member of staff about any issues which are negatively impacting their academic study and which are beyond the normal scope of issues handled by Programme Convenors and Personal Tutors.

Students are provided with information about learning resources, the Library and information available on Learn.gold (VLE) so that they have access to department/ programme handbooks, programme information and support related information and guidance.

Taught sessions and lectures provide overviews of themes, which students are encouraged to complement with intensive reading for presentation and discussion with peers at seminars. Assessments build on lectures and seminars so students are expected to attend all taught sessions to build knowledge and their own understanding of their chosen discipline.

All assessed work is accompanied by some form of feedback to ensure that students' work is on the right track. It may come in a variety of forms ranging from written comments on a marked essay to oral and written feedback on developing projects and practice as they attend workshops.

Students may be referred to specialist student services by department staff or they may access support services independently. Information about support services is provided on the Goldsmiths website and for new students through new starter information and induction/Welcome Week. Any support recommendations that are made are agreed with the student and communicated to the department so that adjustments to learning and teaching are able to be implemented at a department level and students can be reassured that arrangements are in place. Opportunities are provided for students to review their support arrangements should their circumstances change. The Disability and Wellbeing Services maintain caseloads of students and provide on-going support.

The Careers Service provides central support for skills enhancement, running The Gold Award scheme and other co-curricular activities that are accredited via the Higher Education Achievement Report (HEAR).

The Centre for Academic Language and Literacies (CALL) works with academic departments offering bespoke academic literacy sessions. It also provides a programme of academic skills workshops and one-to-one provision for students throughout the year.

Placement opportunities

Students are able to take a paid placement doing data science work in place of an academic final project. In additional to paid commercial placement, we offer the option of projects that are sponsored and co-supervised by non-profit organisations (e.g. healthcare) or other academic departments or institutions.

Employability and potential career opportunities

The MSc Data Science develops analytic and critical skills, providing successful students with the tools and competencies needed to intelligently interrogate numerical, textual and qualitative data; to extract meaning from raw information; and to communicate the results of their investigations, and their implications, to stakeholders or other interested parties. These skills lead naturally to embarking on a variety of careers, with employers from the financial sector, technology firms small and large, biomedical research sector, the charitable and voluntary sector, and public research sector. The mix of attributes encouraged by the programme as technical ability to manage and process data, reflection, and insight to develop understanding, and empathy and awareness to communicate it effectively is highly desirable to prospective employers. The programme's structure, in particular, around the final project and preparation for it, encourages student engagement with projects requiring the services of data scientists, and will provide networking opportunities to start the students along their chosen career path. Our graduates will be exposed to the ethical issues of data science; in the modern era of data availability, it is crucial that all participants in data exchange and treatment are aware of the impact of their behavior on privacy, anonymity and personal security.

Students are supported from the start to the finish of this programme in order to understand the different potential career journeys they can follow and to build a portfolio of work to demonstrate their capability to gain employment or freelance work in that area. Assessment has been designed to facilitate this process through the development of transferable or soft skills listed in the section above. Regular guest lectures from industry support the development of sector knowledge and awareness of different career paths.

The Department's External Advisory Board ensures relevance of all our programmes to the current and future needs of employers. All programmes are designed in consultation with employers to make sure you develop transferable skills to improve your career opportunities and you will be applying your skills to real-world problems through live project briefs and group projects. The board and other employers attend showcase events where you can present your ideas, get feedback and build important connections.

We have dedicated employability resource within the department to build employer relations and manage additional initiatives to support your future career opportunities, including regular communication of external opportunities for mentoring and work experience and an annual Career week (a focussed week of career support every June in the department where you can access alumni panels by programme and a range of industry talks).

Programme-specific requirements

To progress to the Final Project, students must fulfil the requirements for a pass at PGDip level (pass all 120 credits of taught modules), with the exception that students may progress carrying over 30 credits of taught modules for a late summer resit.

Tuition fee costs

Information on tuition fee costs is available at: https://www.gold.ac.uk/students/fee-support/.

Specific programme costs

Not applicable.