



**UNIVERSITY
OF LONDON**

Programme Specification 2019–2020

Data Science and Artificial Intelligence

MSc
PGDip

Important document – please read



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Important information regarding the Programme Specification

About this document

Last revised: 05 August 2019

The Programme Specification gives a broad outline of the structure and content of the programme, the entry level qualifications, as well as the learning outcomes students will achieve as they progress. Some of the information referred to in this programme specification is included in more detail on the University of London website. Where this is the case, links to the relevant webpage are included.

Where links to external organisations are provided, the University of London is not responsible for their content and does not recommend nor necessarily agree with opinions expressed and services provided at those sites.

If you have a query about any of the programme information provided, whether here or on the website, registered students should use the *Ask a question* tab in the [Student Portal](#). Otherwise, the *Contact Us* button at the bottom corner of every webpage should be used.

For the Data Science and Artificial Technology programmes, you should note the following terminology:

Module: Individual units of a programme are called modules. Each unit is a self-contained, formally structured learning experience with a coherent and explicit set of learning outcomes and assessment criteria.

Core module: Core modules are central to the teaching and learning on the programme and often introduce concepts and ideas that appear in the optional modules. Core modules must be passed and cannot be compensated.

Compulsory module: Compulsory modules introduce concepts and ideas that appear in optional modules. Students must take these modules as part of their studies. They are subject to the rules for compensation.

Optional module: Optional modules are designed to extend the concepts and ideas introduced in core and compulsory modules and to introduce other relevant concepts and techniques. Students may select their optional modules from a list. They are subject to the rules for compensation.

Key revisions made

Programme specifications are revised annually. The quality committee of Goldsmiths, University of London, as part of its annual review of standards, confirms the programme structure and the educational aims and learning outcomes, and advises on any development in student support.

Significant changes made to the programme specification 2019-2020:

This programme is being offered for the first time in 2019-2020.

Programme title and awards

Postgraduate Degrees of the University of London may be classified. Your award certificate will indicate the level of the academic performance you achieved by classifying your award. The classification of your degree will be based on the marks from the assessed work you complete.

The classification system for these programmes is as follows:

Distinction

Merit

Pass

Specific rules for the classification of awards are given in the [Programme Regulations](#), under Scheme of Award.

Programme name

Data Science and Artificial Intelligence

Award titles

- Master of Science in Data Science and Artificial Intelligence
- Postgraduate Diploma in Data Science and Artificial Intelligence
- Postgraduate Certificate in Data Science

Intermediate awards

The intermediate qualifications for this programme are the Postgraduate Certificate and Postgraduate Diploma as listed above.

Students may be awarded an intermediate qualification (i.e. a related certificate or diploma) as they progress through the MSc or Postgraduate Diploma if they complete the requirements for that award. The student may apply for the intermediate qualification whether or not they are registered on it. The specific rules are given in the [Programme Regulations](#) under Section 1.

Exit awards

Students who for academic or personal reasons are unable to complete their MSc may exit the programme with the successful completion of 120 or 60 credits and be awarded a Postgraduate Diploma or Postgraduate Certificate respectively. All Postgraduate Certificates will be awarded in Data Science only. Postgraduate Diplomas will be awarded in line with the student's registered programme of study. Exit qualifications are awarded at the discretion of the Board of Examiners. Once a student has accepted an exit qualification they will not be permitted to continue their study towards a higher award on the programme.

Award titles may be abbreviated as follows:

Master of Science – MSc

Postgraduate Diploma – PGDip

Postgraduate Certificate– PGCert

Level of the programmes

The Framework for Higher Education Qualifications in England, Wales and Northern Ireland (FHEQ) forms part of the UK Quality Code for Higher Education of the [Quality Assurance Agency for Higher Education](#) (QAA).

The awards are placed at the following Levels of the Framework for Higher Education Qualifications (FHEQ):

- MSc – level 7
- PGDip– level 7
- PGCert– level 7

Awarding body

University of London

Registering body

University of London

www.london.ac.uk

Academic direction

Goldsmiths, University of London

Accreditation by professional or statutory body

Not applicable

Language of study and assessment

English

Mode of study

Web supported learning with an online tutor or institution supported learning from a local institution, where this is available.

The [website](#) provides further information about the University's Recognised Teaching Centres.

Maximum and minimum periods of registration

The MSc can be completed in one year, or students can take up to five years. This flexibility allows students to study at their own pace (either part-time or full-time), adjusting the intensity of their study to suit their needs. The minimum and maximum periods of registration for the programme are included in the table:

	Minimum	Maximum
MSc	One year*	Five years
Postgraduate Diploma	One year*	Five years
Postgraduate Certificate	Six months*	Five years

*Subject to module availability

Programme structures

The programmes will have two registration points in the year corresponding with start dates for modules.

Students have an online induction session available through the Virtual Learning Environment (VLE) prior to the start of their initial study session, which will include orientation of their learning environment and guidance on the structure and learning expectations of the programme.

The **MSc in Data Science and Artificial Intelligence** is a 180 UK credit degree programme (90 ECTS credits). For the MSc a student must complete:

- four core modules (60 credits total)
- three compulsory modules (45 credits total)
- three optional modules (45 credits total)
- a Final Project (30 credits total)

The **Postgraduate Diploma in Data Science and Artificial Intelligence** is a 120 credit programme (60 ECTS credits). For the Postgraduate Diploma a student must complete:

- four core modules chosen (60 credits total)
- three compulsory modules (45 credits total)
- one optional modules (15 credits total)

The **Postgraduate Certificate in Data Science** is a 60 credit programme (30 ECTS credits). For the Postgraduate Certificate a student must complete:

- any two core modules (30 credits total)
- any two other modules (either further core or optional modules) (30 credits total)

Credit value of modules

Further information about the credit systems used by universities in the UK and Europe is provided by the [Quality Assurance Agency](#) and the [European Credit Transfer and Accumulation System](#).

Where credits are assigned to modules of a programme, credit indicates the amount of learning carried out in terms of the notional number of study hours needed, and the specified [Framework for Higher Education Qualifications in England](#) (FHEQ) credit level indicates the

depth, complexity and intellectual demand of learning involved. The details below indicate the UK credits and the European Credit Transfer and Accumulation System (ECTS) values.

For the Data Science programmes, modules have the following credit values:

- core, compulsory, and optional modules are worth 15 UK credits or 7.5 ECTS credits each
- the final project is worth 30 UK credits or 15 ECTS credits

One UK credit equates to a notional ten hours of study.

Recognition of prior learning

Recognition of prior learning is a generic term for the process by which we recognise and, where appropriate, award credit for learning that has taken place at an institution other than the University of London. Where the prior learning covered a similar syllabus to a module/course on the University of London programme, credit will be awarded as if you took the University of London module/course.

See the [General Regulations](#) (Section 3) and the [Programme Regulations](#) for more rules relating to prior learning.

For this programme the University of London may recognise your prior learning and award you credit towards the qualification up to the value of 120 UK credits.

Further information on recognition of prior learning is on the [website](#).

Entrance requirements

Applicants must submit an application in line with the procedures and deadlines set out on the [website](#).

Entry Route 1

To be eligible to register for any of the Data Science programmes, applicants must have the following:

- A bachelor's degree (or an acceptable equivalent) in a relevant subject which is considered at least comparable to a UK second class honours degree, from an institution acceptable to the University.

Entry Route 2

If applicants do not meet the academic requirements for entry route 1, they can apply for the programme via entry route 2.

To be eligible to register, applicants must have the following:

- A bachelor's degree (or an acceptable equivalent) in any subject which is considered at least comparable to a UK second class honours degree, from an institution acceptable to the University;

In addition to the above, applicants will be required to complete an online preparatory course **prior to registration**.

This route helps applicants to develop the necessary skills to complete any of the full MSc programmes successfully.

The online preparatory course, Foundations of Data Science, requires approximately 30 hours of study.

Full details of entrance requirements are given on the [programme page](#), under the Requirements tab.

English language requirements for the Data Science programmes

Applicants will meet the English language requirement if they have passed any of the following within the past three years:

- (IELTS) International English Language Testing System - an overall score of 6.5 or above with a minimum of 6.0 in the written test
- Pearson Test of English (Academic) – an overall score of 59 or above, with at least 59 in both the reading and writing tests and at least 54 in the speaking and listening tests
- Cambridge English: Proficiency qualification
- Cambridge Certificate of Advanced English - grade C or above; *or*,
- (TOEFL) iBT Test of English as a Foreign Language – an overall score of 92 or above, with at least 22 in both the reading and writing skills tests and at least 20 in both the speaking and listening tests.

Alternatively, an applicant may satisfy the English language requirements for an MSc, Postgraduate Diploma or Postgraduate Certificate if they have:

- Substantial education (minimum of eighteen months) conducted and assessed in English *or*
- Substantial work experience (minimum of eighteen months) conducted in English.

Where an applicant does not meet the prescribed English language proficiency requirements but believes that they can demonstrate the requisite proficiency for admission the University may, at its discretion, consider the application.

Computer specification and internet access

All students must have regular access to a computer (or mobile device*) with an internet connection to use the University of London International Programmes website and the Student Portal. These are where the programme's study resources are located. Through the Student Portal, students can register, enter exams and use the programme's Virtual Learning Environment (VLE). The VLE provides electronic learning materials, access to the University of London Online Library, networking opportunities, and other resources.

For students to get the most from their studies, their computers should have at least the following minimum specification:

- a web browser (the latest version of Firefox, Chrome or Internet Explorer are recommended). This must accept cookies and have JavaScript enabled
- screen resolution of 1024 x 768 or greater
- sufficient bandwidth to access and upload video content
- the ability to play videos including sound and speakers.

And the following applications installed:

- a word processor that accepts Microsoft Word formats (.doc and .docx)
- a PDF reader (e.g. Adobe).

Certain courses may have additional requirements, such as:

- video and audio recording capability, such as via web cam or other device
- microphone
- the ability to install software on the computer, noting that in the institution supported model it is expected that the institution should install all necessary software on lab machines where appropriate
- installation of a programmer's text editor such as Atom and integrated development environment software (IDE) where necessary.

Students with specific access requirements

The University of London welcomes applications from disabled students and/or those who have access requirements. The University will make every effort to provide reasonable adjustments to enable those with a disability, learning difficulty or access requirements to have the same opportunity as all other students to successfully complete their studies. The University is committed to managing the application procedure and the programme itself to ensure that services are accessible for all students and that an inclusive environment is created. Students with a disability, or others who may need access arrangements to assist in taking examinations, should complete the relevant section of the application form, or contact the [Inclusive Practice Manager](#). A separate room or other arrangements may be considered.

Requests are considered by a University panel, whose purpose is to ensure that students with disabilities and/or specific access requirements are neither advantaged nor disadvantaged by such arrangements when compared with other students. These considerations remain separate from the academic selection processes.

For further information, see [Inclusive Practice Policy](#)

Sources of funding and scholarships

Information about potential sources of funding and scholarships is updated annually and where available is included in the prospectus web pages.

For further information see the [website](#)

Educational aims and learning outcomes of the programmes

Programme aims

These innovative online programmes aim to provide students with support through virtual and local learning environments, and the flexibility to study at any time and from anywhere around the globe. They will also 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.

MSc Learning Outcomes

A: Knowledge, Understanding and Cognitive Skills

A student studying the **MSc in Data Science and Artificial Intelligence** is expected to be able to:

1. Explain and critically assess a range of artificial intelligence techniques used in data analytics and in other related areas.
2. Critically evaluate emerging data analysis technologies and assess how it can be applied to different types and amounts of data.
3. Analyse in depth how artificial intelligence techniques can be applied to a range of interdisciplinary research areas.
4. Compare and contrast practical and theoretical contexts in which data scientists work.

B: Practical, Professional and Key Skills

A student studying the **MSc in Data Science and Artificial Intelligence** is expected to be able to:

1. Critically analyse the application of technology to a range of real world problems particularly in industry and interdisciplinary research.
2. Apply advanced skills and research-led specialist knowledge in the areas of artificial intelligence to the design of software and data analyses.
3. Demonstrate a deep understanding of cutting edge technologies in the creation of a substantial commercially and/or research-wise relevant project.
4. Propose, plan, execute and evaluate a significant piece of original work.
5. Design and program complex computer software and data products.
6. Use academic writing and presentation skills to write and present about data science topics.

Postgraduate Diploma Learning Outcomes

A: Knowledge, Understanding and Cognitive Skills

A student studying the **Postgraduate Diploma in Data Science and Artificial Intelligence** is expected to be able to:

1. Explain and critically assess a range of artificial intelligence techniques used in data analytics and in other related areas.
2. Critically evaluate emerging data analysis technologies and assess how it can be applied to different types and amounts of data.
3. Analyse in depth how artificial intelligence techniques can be applied to a range of interdisciplinary research areas.
4. Compare and contrast practical and theoretical contexts in which data scientists work.

B: Practical, Professional and Key Skills

A student studying the **Postgraduate Diploma in Data Science and Artificial Intelligence** is expected to be able to:

1. Critically analyse the application of technology to a range of real world problems particularly in industry and interdisciplinary research.
2. Apply advanced skills and research-led specialist knowledge in the areas of artificial intelligence to the design of software and data analyses.
3. Apply an understanding of cutting edge technologies in the creation of a substantial commercially and/or research-wise relevant project.
4. Design and program sufficiently complex computer software and data products.

Postgraduate Certificate Learning Outcomes

A: Knowledge, Understanding and Cognitive Skills

A student is expected to be able to:

1. Explain and critically assess a range of machine learning and statistical data mining techniques used in data analytics and in other related areas.
2. Critically evaluate emerging data analysis technologies and assess how it can be applied to different types and amounts of data.
3. Compare and critically contrast practical and theoretical contexts in which data scientists work.

B: Practical, Professional and Key Skills

A student is expected to be able to:

1. Critically analyse the application of technology to a range of real world problems particularly in industry and interdisciplinary research.
2. Apply advanced skills and research-led specialist knowledge in the areas of machine learning and statistics to the design of software and data analyses.

3. Design and program sufficiently complex computer software and data products.

Learning, teaching and assessment strategies

The core principles of the learning, teaching and assessment strategy for these programmes are outlined below.

Principle 1: Ensuring students are prepared for study

Students will be provided with opportunities to sample the learning content of the Data Science programmes. An online induction will ensure that they are prepared for study and are familiar with the learning environment and sources of support during their student journey.

Principle 2: An engaging and vibrant learning environment

All students will have access to an online learning environment with learning support and tools enabling them to monitor their progress, assessing fulfilment of learning outcomes and development of skills-based outcomes throughout the curriculum. The learning environment will provide a framework for the level of support selected by students, which involves local and online tuition services.

Principle 3: Learning content

The learning content will be designed to provide students with opportunities to engage, and encourage reflective and deep learning, with accessibility a key feature to enable students to study across a range of mobile and media channels.

Principle 4: Student support

All students will have access to the learning environment, learning content, tools and activities related to their chosen programme of study. Students will be able to select from two modes of study: web supported learning or institution supported learning.

Principle 5: Flexibility

To facilitate the requirements of a diverse global community of learners a core feature of this programme is flexibility in the design of the curriculum, providing for pathways to sub-degree and full degree awards and facilitating student progress at a pace suitable to their circumstance.

Principle 6: Assessment

A core feature of these programmes will be a varied range of learning activities embedded within the learning content for each module, designed to provide feedback to students on their progress towards learning outcomes. Summative assessment methods will be designed to promote retention of knowledge, providing encouragement through tutor feedback, with as wide a range of methods as possible to most effectively assess learning outcomes, within the context of the need for secure and reliable techniques appropriate to flexible learning.

Principle 7: Staff Development

The design, development and delivery of these programmes will be supported with training for:

- Academic teams involved in the development of the materials and assessment;
- Module Leaders;
- Tutors and Administrators at teaching institutions.

Assessment methods

For all programmes, each core and optional module (apart from the final project) is summatively assessed by a coursework element (30%) and a written examination element (70%). The coursework element consists of one or more writing assignments and/or one or more programming assignments. The written examination is three hours in length; some examinations are unseen while others allow for some aspect of the examination to be disclosed in advance.

The final project is summatively assessed by a series of coursework submissions and an unseen, final exam. Coursework accounts for 70% of the final mark and the examination for 30% of the final mark. The coursework submission constitutes multiple, staged deliverables including, but not limited to: a project proposal, a preliminary report, weekly progress logs, a final report and a presentation. The project assessment and the feedback received by the student, is designed to encourage consistent, well-structured activity and progress throughout the project. The exam component consists of general questions about academic best practice, as well as specific questions about the candidate's own project work.

The grade awarded for each module is based on all the elements of assessment.

Students are required to pass each element of the assessment subject to the application of the rules for marginal compensation, where permitted. Refer to the [Programme Regulations](#).

Written examinations take place in September and March.

Examinations are held at [Examination centres](#) throughout the world.

Coursework must be submitted in the VLE by prescribed deadlines.

Student support and guidance

Key features of the support for students include:

- Student induction resources;
- VLE containing: self-assessment and student planner tools; comprehensive learning materials; e-resources/e-library; student forums and progress monitoring tools;
- Local institution tutor (for institution supported learners);
- Online student relationship manager and online tutor (for web supported learners).

Quality evaluation and enhancement

The University of London delivers the majority of its flexible and distance learning programmes through a collaboration between the University of London Worldwide and member institutions of the University of London. However some of the flexible and distance learning programmes draw solely on academic input from the University of London, and are

delivered without academic lead by a member institutions. The policies, partnerships (where applicable) and quality assurance mechanisms applicable for the programmes are defined in the following key documents: The Quality Framework, the [Quality Assurance Schedules](#), [Guidelines for Examinations](#), [General Regulations](#) and, for each programme, [programme specific regulations](#).

Awards standards

All University of London awards have to align with the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies to assure appropriate awards standards. In addition, every programme that is developed by a member institution of the University of London (or a consortium with representation by more than one member institution) will be developed to the same standard as would be applied within the institution concerned. Proportionate and robust approval procedures, including external scrutiny and student engagement are in place for all programmes. Learning materials are written and examinations are set and marked by academic staff who apply the University's academic standards.

Review and evaluation mechanisms

Some of the key mechanisms in place to assure the standards of all University of London awards and the quality of the student experience, include:

- Annual programme reports: produced for all programmes in order to review and enhance the provision and to plan ahead;
- Independent external examiners: submit reports every year to confirm that a programme has been assessed properly and meets the appropriate academic standards;
- Annual student information statistics: prepared for all systematic reporting within the University of London;
- Periodic programme reviews: carried out every 4-6 years to review how a programme has developed over time and to make sure that it remains current and up-to-date.

Improvements are made as necessary to ensure that systems remain effective and rigorous.

Student feedback and engagement

The Student Experience Survey, carried out every two years, collects feedback from the student body on a range of topics relating to the student lifecycle. The results are considered in a number of different ways, including by the Pro-Vice Chancellor, the programme team, principal committees and departments at the University of London responsible for the different aspects of the student experience. Once the findings have been considered in detail, responses are published from both the University of London and from the individual Programme Directors.

Additional survey activity may also be conducted from time to time through the student portal, by email or from the programme team.

VLEs also provide the opportunity for informal feedback and discussion.

An undergraduate and postgraduate student member is appointed by the University to the majority of committees through an annual appointment round. Some programmes also recruit student members at the programme level. Students are frequently invited to take part in quality review processes such as Periodic Programme Reviews, Programme approval,

Thematic Reviews, MOOC review panels and ad hoc focus groups. Opportunities such as these are advertised through social media and on the website. More information can be found on the [website](#).

After graduation

Further study

Successful completion of the programme may serve as preparation for students who wish to go on to take further study in the subject area. Enquiries about further study opportunities should be directed to the University of London Student Advice Centre.

Employment routes

The MSc Data Science and Artificial Intelligence programme develops analytical and practical skills, providing successful students with the tools and competencies of intelligent data analysis for decision making and problem solving, and communication of 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 leading technology firms, robotics, military, academia, and public research sector.

The Alumni Network

Upon graduation, students automatically become members of the University of London Alumni Network, a diverse worldwide community of alumni in more than 180 countries. The Alumni Network can provide past students with lifelong links to the University of London and each other. Benefits include social and networking events, access to local groups, a bi-annual magazine, social networking groups, and the opportunity to become an Alumni Ambassador for the University of London.

For further information, please see <https://london.ac.uk/alumni>, www.facebook.com/londonualumni, www.instagram.com/londonu and <https://www.linkedin.com/school/university-of-london/>