Middlesex University

Programme specification

1. Programme title(s)

BSc (Hons) Artificial Intelligence and Data Science

BSc (Hons) Artificial Intelligence and Data Science with Foundation Year

BSc Artificial Intelligence and Data Science

DipHE Artificial Intelligence and Data Science

CertHE Artificial Intelligence and Data Science

2. Awarding institution

Middlesex University

3. Teaching institution

Middlesex University: London

Middlesex University: Dubai

Middlesex University: Mauritius

4. Length and mode of study

a) Length and mode:

FT/PT/TKSW London

FT Dubai (Sept / Jan)

FT/PT Mauritius [PT = Sept start only]

b) Delivery method:

On-campus/Online

5. Professional/Statutory/Regulatory body (if applicable)

N/A

6. Apprenticeship standard (if applicable):

N/A

7. Language of study

English

8. Will this be delivered as a Continuing Professional Development (CPD) programme?

No

9. Criteria for admission to the programme

Students should have the equivalent of 112–128 UCAS points including GCSE Grade 4/C in English and Mathematics to gain entry to level 4.

London only: Please refer to the programme specification for the Foundation Year for criteria for admission to the BSc Artificial Intelligence and Data Science

Middlesex University has a flexible and personalised approach to admissions and we accept applications from students with a wide range of qualifications and a combination of qualifications. Please check our general entry requirements page (available at https://www.mdx.ac.uk/study-with-us/undergraduate/entry-requirements-for-undergraduates) to see how these points can be achieved from our acceptable level 3 qualifications and the combinations, which are welcomed by Middlesex University, including GCSE requirements.

If you have achieved a qualification such as a foundation degree or HND, or have gained credit at another university, you may be able to enter the programme in year two (level 5) or three (level 6). For further information please visit our Transfer students page (available at https://www.mdx.ac.uk/study-with-us/undergraduate/how-to-apply-for-undergraduate-courses). For direct entry to levels 5 and 6 students are required to pass the equivalent of 120 credits specified in the

programme at levels 4 and 5, respectively. Applicants will be expected to demonstrate the programme learning outcomes have been met at these levels.

Applications from mature candidates without formal qualifications are welcomed, provided they can demonstrate appropriate levels of relevant ability and experience. Recognition of Prior Learning (RPL) is permitted. Mature applicants with relevant work experience are welcome to apply for direct entry at levels 3, 4 and 5. These applicants are required to submit a portfolio of work experience to show evidence of achieving relevant learning outcomes, and these will vary depending on both the programme and level the student is applying for. Evidence should comprise the applicant's own work and may include documents they have written, procedures they have designed, proposals they have drafted, electronic resources, photographs, video etc. or information gathered from others about you such as statements from employers, certificates of in-house courses completed.

Individual applicants may wish to claim certain number of credits against their learning that may have taken place outside education or through training that is not assessed as part of an education system. Typically, these applicants would possess knowledge and skills that may have been acquired at the workplace through practice but may not be supported by formal qualifications. Applicants may also hold academic, vocational or professional qualifications that may be aligned to certain modules of the programme at an appropriate level. Typically, such qualifications are supported by evidence in the form of certification. Each of these cases is considered individually with the scope to assess whether applicants should be allowed in the programme with specific credit that would count towards the end qualification, to an appropriate point of the programme. As each case is treated individually,

applicants should seek support from the programme team towards their application with Recognition of Prior Experiential Learning or Recognition of Prior Certificated Learning.

International students who have not been taught in the English medium must show evidence of proven ability in English such as IELTS grade 6.0 (with a minimum of 5.5 in all sections).

The University provides pre-sessional English language courses throughout the year for candidates who do not meet the English requirements.

University policies supporting students with disabilities apply, as described in the University Regulations. For further information, visit the learning resources web site at: http://unihub.mdx.ac.uk/support

Further guidance may be obtained from the Programme Leader or Director of Programme

10. Aims of the programme

The programme aims to provide students with a thorough understanding of Artificial Intelligence and Data Science. This will give them a strong background that will enable them to work in this rapidly evolving field. They will gain an understanding of the underlying theory, the ability to design, develop and maintain systems, and to incorporate existing systems. They will be able to communicate with other experts and those with no background in the field about the systems they have developed.

Students will gain proficiency in programming languages, software design and development, algorithm development, data analysis, machine learning, search, data and knowledge representation, and existing software libraries and packages. Moreover, they will gain the ability to learn new techniques and concepts as these evolve in the rapidly developing field. This will all be done within a professional, legal and ethical framework that addresses data management, security, privacy, equality, diversity, inclusion and sustainability.

11. Programme learning outcomes

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of:

1. Essential theories, concepts, principles and practices relating to Artificial Intelligence and Data Science.

2. Criteria of quality and performance in the selection and application of tools and techniques within various Artificial Intelligence and Data Science scenarios.

3. The effective use of techniques, tools, and programming environments for developing and deploying Artificial Intelligence and Data Science systems.

4. Suitable methodologies and task execution within a professional, legal, and ethical framework – including data management and use, security, equality, diversity and inclusion and sustainability within the field of computer science.

Middlesex University

B. Skills

On completion of this programme the successful student will be able to:

1. Apply detailed judgement, critical thinking, ethics, and problem-solving skills to solve both well-specified and loosely defined problems, to create appropriate artefacts. Data Science and AI are applicable to practically every domain, but examples used on the course may include health care, cognition, finance, engineering, tutorial systems, and images.

2. Undertake problem identification, analysis and design, development, testing, integration and deployment of a complex system and any associated artefacts.

3. Work as a member of a team, successfully communicate, manage tasks, and plan projects with minimum guidance.

4. Communicate Artificial Intelligence and Data Science ideas, and solutions that resonate with diverse audiences including specialist and non-specialist audiences through effective written and spoken communication, as well as suitable presentation methods.

5. Evaluate and deploy a wide range of computer systems in diverse application domains.

6. Adapt and apply their knowledge and skills to mastering new technical areas through self-paced study and research.

12. Learning and teaching methods

The programme emphasises the importance of practical application through hands-on projects developed in groups and individually. Our programme team will support student's learning with authentic assessment and research-based learning materials that will ensure graduates are well-versed in theoretical concepts and the practical skills needed for industry and further studies.

The teaching and learning methods within the BSc Artificial Intelligence and Data Science programme have been designed to provide students a structured academic journey through:

- Interactive Concept Discussion Sessions (ICDS) illustrating theories, concepts and principles through case studies, examples, and scenarios.
- Practice-led learning activities.
- Brief video recordings covering key concepts.
- Supervised practical work.
- Guided individual and group research.
- Open-ended practical assignments.
- Online collaborative environments enable the students to gain skills with standard industrial development tools.
- Supervised laboratories and practical exercises.
- Critical thinking and problem-solving activities.
- Individual and group coursework assignments.
- Online drop-in sessions.
- Student presentations.
- Technical and reflective reports allow students to gain communication skills.
- Project work.
- One to one sessions with academics.
- Implementing programs.
- Practical application of concepts, principles and models to specific case studies and scenario.
- Supervised tutorial and seminars.
- Use of case tools for analysis and design, and online collaborative tools.
- Formative and summative assessment, and feedback on assignments.

These activities are complemented by dedicated sessions to support employability with academic advising sessions, talks given by invited speakers from industry (including alumni), workshops from the university employability service and internal speakers (e.g. the Learning Enhancement Team, International Mobility, etc) that aim to support students in contextualising their technical knowledge and understanding.

All module-specific learning materials are available for students on an online virtual learning environment (VLE) to access anytime. This is furthered through recorded key-concept short videos explaining fundamental concepts as well as printed and

digital versions of handouts and booklets. Coursework often has an option between a data science task and an AI task.

13. Employability

a) Development of graduate competencies

Most of the basic skills taught in the programme are skills needed by AI practitioners and datascientists. In particular, most modules on the programme require students to develop programs. Other AI and data science skills include the ability to use and implement machine learning, search spaces, knowledge representation and data analysis techniques. Softer skills, including communication, awareness of ethical issues, and writing are also necessary for competent graduates. Perhaps the most important skill that is developed on the programme is the ability to research techniques and areas that the student does not already know including new areas as they emerge.

b) Employability development

Complementing the graduate competencies of the prior box are the skills needed by employed AI practitioners and data scientists. The skills, including programming, research and analysis, are needed by employed AI and data science practitioners. These skills are taught through-out the programme. This tuition is supplemented by discussions about actually finding employment, and building up a network of professional colleagues.

c) Placement and work experience opportunities

London only: All undergraduate students have the opportunity to undertake an Industrial Placement. Industrial Placements are highly encouraged by the Faculty and the University. Placements give students valuable experience, which enhances their future career prospects.

Students who undertake a placement year (TKSW mode) normally achieve better results in their final year. Please note the following:

- Available at London only
- The placement provides a year's experience as an appropriately paid graduate trainee.
- Industrial placement is conditional on the successful completion of all modules at Levels 4 and 5. Students need 240 credits before they are able to embark on an industrial placement.
- Obtaining a placement is co-ordinated through the Employability and Careers Centre, and by a dedicated team of placement officers for the Faculty of Science and Technology. The programme team and particularly the industrial liaison can offer particular support.
- For undergraduate programmes, students wishing to undertake a placement position must register for the placement module. This is CST3500 Supervised Industrial Placement, an optional module.
- Each placement will be assigned to an industrial tutor who will visit the student during their placement.
- On graduation, the degree will be qualified with the term "having followed an approved sandwich programme".
- Students who complete the Supervised Industrial Placement module on TKSW mode will receive an additional qualification referred to as a *Diploma of Industrial Studies*.

Dubai / Mauritius

TKSW mode is not available. Students are encouraged to undertake internships during the term holidays.

d) Future careers/progression

All programmes – their curricula and learning outcomes – have been designed with an emphasis on currency and relevance to future employment. Professional development and employability skills are embedded into teaching, learning and assessment at all levels of the programme. The BSc in AI and Data Science prepares students for careers in high-demand fields such as artificial intelligence, data science, and analytics. Graduates can pursue roles such as AI Engineer, Data Scientist, Machine Learning Specialist, and AI Consultant across various industries, including finance, healthcare, technology, logistics, and government. Graduates are also well-prepared for further studies in our master's programmes available across the campuses such as MSc Computer Science, MSc Data Science, MSc Network Management and Cloud Computing, and MSc Cyber Security and Pen Testing. Employer links are fostered through:

- inviting practitioners from industry as guest speakers.
- Through links with companies where students are employed as part of their Industrial Placement.
- Through links with alumni, both in the UK and overseas.

Graduates will have the opportunity to develop and deploy AI models in fields such as finance, healthcare, and analysing large data sets where they can deploy machine learning techniques. Graduates can seek professional certification from MS, AWS and Google professional learning engineer. Graduates also have ample opportunities to pursue entrepreneurial pathways.

14. Assessment strategy

- Reflective and technical reports.
- Individual and group presentations.
- Online quizzes.
- Individual and group coursework assignments.
- Coding and commenting.
- Modelling systems.
- Assessing case studies.
- Design exercises.
- Practical artefact demonstrations.
- Viva with two academics for project work.
- Project work.
- In class assessment.

15. Programme structure

Full time/ThicKSandWich (TKSW) structures:
September (All campuses)/ January intakes (London and Mauritius and Dubai)
[ThicKSandWich available at London only]

September Start:

Year 1 (Level 4):

Semester 1 (September):

CST1510 – Programming for Data Communications and Networks

CST1440 – Introduction to AI and Data Science

Semester 2 (January):

CST1450 – Algorithms and Data Analysis

CST1460 – Agent and Data Science Applications

Exit award: CertHE Artificial Intelligence and Data Science

January Start:

Year 1 (Level 4):

Semester 2 (January):

CST1450 – Algorithms and Data Analysis

CST1460 – Agent and Data Science Applications

Semester 3 (April):

CST1510 – Programming for Data Communications and Networks

CST1440 – Introduction to AI and Data Science

Exit award: CertHE Artificial Intelligence and Data Science

Year 2 (Level 5):

Semester 1:

CST2120 – Web Applications and Databases

CST2330 – Data Analysis for Enterprise Modelling

Semester 2:

CST2410 – Machine Learning and Other AI Techniques

CST2420 – Large Language Model

Exit award: DipHE Artificial Intelligence and Data Science

Year 3 (Level 6):

CST3500 - Industrial Placement Year (**compulsory for TKSW mode only**) [**120**] (London **only**)

Year 3/4 (Level 6):

Semester 1:

CST3140 – Current Trends in AI

Choose one of the following optional modules:

CST3420 - Biologically Inspired Algorithms

PDE3802 - AI in Robotics

Semester 2:

CST3990 – Undergraduate Individual Project

Choose one of the following optional modules:

CST3520 – Defensive Security

CST3430 - Mathematics of AI and Data Science

CST3440 – Spiking Neutral Networks

Exit award: BSc Artificial Intelligence and Data Science

Indicative Part-Time Structure – September Intake

Year 1 (Level 4):

Semester 1:

CST1510 – Programming for Data Communication and Networks

Semester 2:

CST1450 – Algorithms and Data Analysis

Year 2 (Level 4):

Semester 1:

CST1440 – Introduction to AI and Data Science

Semester 2:

CST1460 – Agent and Data Science Applications

Year 3 (Level 5):

Semester 1:

CST2120 – Web Applications and Databases

Semester 2:

CST2410 – Machine Learning and Other AI Techniques

Year 4 (Level 5):

Semester 1:

CST2330 – Data Analysis for Enterprise Modelling

Semester 2:

CST2420 – Large Language Models

Year 5 (Level 6):

Semester 1:

CST3410 – Current Trends in AI

Semester 2:

Choose one of the following optional modules:

CST3520 – Defensive Security

CST3430 – Mathematics of AI and Data Science

CST3440 – Spiking Neutral Networks

Year 6 (Level 6):

Semester 1:

Choose one of the following optional modules:

CST3420 – Biologically Inspired Algorithms

PDE3802 – AI in Robotics

Semester 2:

CST3990 – Undergraduate Individual Project

Full-Time April intake (Mauritius campus only)

Year 1 (Level 4):

Semester 3 (April-July):

CST1510 – Programming for Data Communications and Networks

CST1440 – Introduction to AI and Data Science

Semester 1 (September-December):

CST1450 – Algorithms and Data Analysis

CST1460 – Agent and Data Science Applications

Exit award: CertHE Artificial Intelligence and Data Science

Year 2 (Level 5):

Semester 3 (April-July)

CST2120 – Web Applications and Databases

CST2330 – Data Analysis for Enterprise Modelling

Semester 1 (September-December):

CST2410 – Machine Learning and Other AI Techniques

CST2420 – Large Language Models

Exit award: DipHE Artificial Intelligence and Data Science

Year 3 (Level 6):

Semester 3 (April-July):

CST3410 – Current Trends in AI

Choose one of the following optional modules:

CST3420 – Biologically Inspired Algorithms

PDE3802 – AI in Robotics

Semester 1 (September-December):

CST3990 – Undergraduate Individual Project

Choose one of the following optional modules:

CST3520 – Defensive Security

CST3430 – Mathematics of AI and Data Science

CST3440 – Spiking Neutral Networks

Indicative Part-Time Structure – April intake (Mauritius)

Year 1 (Level 4):

Semester 3 (April-July):

CST1510 – Programming for Data Communication and Networks

Semester 1 (September-December):

CST1450 – Algorithms and Data Analysis

Year 2 (Level 4):

Semester 3 (April-July):

CST1440 – Introduction to AI and Data Science

Semester 2 (September-December):

CST1460 – Agent and Data Science Applications

Year 3 (Level 5):

Semester 3 (April-July):

CST2120 – Web Applications and Databases

Semester 1 (September-December):

CST2410 – Machine Learning and Other AI Techniques

Year 4 (Level 5):

Semester 3 (April-July):

CST2330 – Data Analysis for Enterprise Modelling

Semester 1 (September-December):

CST2420 – Large Language Models

Year 5 (Level 6):

Semester 3 (April-July):

CST3410 – Current Trends in AI

Semester 1 (September-April):

Choose one of the following optional modules:

CST3520 – Defensive Security

CST3430 – Mathematics of AI and Data Science

CST3440 – Spiking Neutral Networks

Year 6 (Level 6)

Semester 3 (April-July):

Choose one of the following optional modules:

CST3420 – Biologically Inspired Algorithms

PDE3802 – AI in Robotics

Semester 1 (September-December):

CST3990 – Undergraduate Individual Project

16. Progression requirements

Students must pass at least 90 credits to progress to Level 5.

Students must have passed at least 210 credits to progress to Level 6.

To achieve Honours, failed credit will need to be repeated.

Non-compensatory modules

- CST3990

17. Programme-specific support for learning

Meeting the learning outcomes of this programme requires active participation in the subject and the development of autonomous practice in meeting objectives. Supporting this level of active participation and autonomous practice is achieved via regular weekly tutorial contact with academic staff, productive and informed support from technical staff and the use of online, resource-based learning materials where appropriate. The subject provides extensive facilities where students can engage with their coursework assignments in a supported and productive environment.

18. HECOS code (Hecos | HESA)

100359

19. Relevant QAA subject benchmarks

Computing (2022)

20. University Regulations

The programme will run in line with general University Regulations. View the full Regulations: Policies | Middlesex University.

21. Reference points

- QAA Subject Benchmark Statement Computing (2022)
- QAA Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (Feb 2024)
- Middlesex University 2031 Learning Framework
- Middlesex University Regulations 24/25
- Middlesex University Learning and Quality Enhancement Handbook (section 3)
- Middlesex University Academic Policy Statement APS 18: Curriculum Design
- Middlesex University LQEH - Guidance 3vii Equality, Diversity and Inclusion in the Curriculum (Inclusive curriculum)

https://www.intra.mdx.ac.uk/resources/learning-teaching-and-students/2031-learning-framework-/

21. Methods for evaluating and improving the quality and standards of learning

Refer to Middlesex Quality processes

22. Other information

The BSc AI and Data Science programme is designed to equip students who successfully complete all modules with the knowledge, technical skills, and practical experience required to pursue employment in the rapidly evolving fields of artificial intelligence and data science. The curriculum provides a strong foundation in core computational principles, data analysis, and AI techniques, ensuring graduates develop competencies that are valued by employers. Students who engage actively with the more challenging aspects of the programme will find the experience intellectually rewarding and will benefit from opportunities to collaborate with peers and develop problem-solving and teamwork skills. As a result, graduates will be well prepared both for entry into relevant professional roles and for progression to postgraduate study should they wish to continue their academic development.

The programme aligns with the principles outlined in the QAA Computing Benchmark Statement, including its emphasis on equality, diversity and inclusion (EDI) and sustainability. Applications are welcomed from students of all backgrounds, and the programme actively encourages participation from groups that are traditionally underrepresented in computing, including women. Teaching materials, case studies, and assessment activities incorporate perspectives from a diverse range of sources, reflecting the global nature of computing and data science. In addition, relevant UN Sustainable Development Goals (SDGs) are discussed within the programme to help students understand how AI and data science can contribute to addressing societal and environmental challenges.