



<b>Programme Title</b>	<b>MSc Artificial Intelligence</b>
<b>Awarding Body</b>	Ravensbourne University London
<b>Teaching Institution</b>	Ravensbourne University London
<b>Final Award</b>	Level 7 – MSc Artificial Intelligence
<b>Interim awards</b>	PGDip HE PGCert HE
<b>UCAS Code</b>	
<b>QAA Subject Benchmark</b>	Computing (postgraduate), 2019
<b>PRSB reference</b>	
<b>Mode of study</b>	1 year Full-time
<b>Date produced/amended</b>	
<b>Course Leader</b>	

### Distinctiveness

Ravensbourne has an established international reputation for innovation at the intersection of design and digital media. The proposed suite of MSc programmes – of which the MSc Artificial Intelligence programme is an integral part – seeks to capitalise and consolidate these past successes, expanding Ravensbourne’s activities from its current position as innovative user of technologies to innovative creator of technologies. The course invites prospective postgraduate students to be part of that journey, empowering them to draw on and learn from this rich history of innovative design thinking and apply this to the creation of new technologies.

To facilitate this, the MSc Artificial Intelligence programme is targeted at graduates and professionals who already have a background in Computing, Data Science, Mathematics or a related field and who are seeking to update their skills to encompass one of the most cutting-edge areas within Computer Science: Artificial Intelligence. To this end, the programme offers modules in Artificial Intelligence Foundations, Machine Learning, Mathematics for Data Analysis, Programming for Artificial Intelligence and Ethics for Artificial Intelligence. In tackling these fields, the curriculum takes a learning-by-doing approach, challenging students to focus on applying the knowledge they’re learning to develop solutions to real-world challenges in a wide range of domains.

Along with the previously mentioned technology-focused modules, the programme also includes three core research, business and innovation focused modules designed to deepen and expand the student’s understanding of the application of technical skills to solving real-world challenges. The *Innovation and Responsibility* module enables students to critically explore the positive and negative effects of the technologies they design and build on the world and society. The *Business Development* module examines the world of business, inviting students to consider how their skills may be applied both within existing businesses and to generate start-ups. Finally, the *Dissertation Project* enables students to bring their interests and passions to bear on a non-trivial research project underpinned by scientific method.

A significant benefit of Masters level study is the expansion of students' professional networks. In recognition of this and in anticipation of the benefits that arise from it, MSc Artificial Intelligence shares the three core non-technical modules with its sister programmes MSc Computer Science, MSc Cyber Security, and MSc/MA Data Visualisation. In sharing these modules, the curriculum seeks to facilitate peer-to-peer learning and collaboration between students with differing knowledge and expertise.

### **Term 1**

In term one, MSc Artificial Intelligence students will undertake technical modules in *Artificial Intelligence Foundations*, *Mathematics for Data Analysis* and *Programming for Artificial Intelligence*. Each module will give students core skills and knowledge in the main fields underpinning the AI. Alongside this, students will also undertake the *Innovation and Responsibility* module with their peers from sister programmes. In doing this, students will be encouraged to consider how their specialist knowledge complements that of their peers on their sister programmes.

### **Term 2**

In term two, students will undertake *Machine Learning* alongside the *Business Development* module. The Machine Learning module enables students to build upon and consolidate their learning from term one, through a focus on improving their knowledge and understanding of a particular area of Artificial Intelligence. The Business Development module, which is shared with their peers from other programmes, provides a space for students to develop an understanding of how their skills in AI may be applied to the world of business. Alongside this, students begin their *dissertation module*, which will run until the end of term 3. The dissertation module will introduce students to postgraduate level scientific research methodologies and invite them to design and execute a non-trivial piece of research.

### **Term 3**

In term three, students are introduced to *Problem Solving with AI* and *Ethics for Artificial Intelligence*. In Problem Solving with AI, students are challenged to find real-world contexts in which to apply their knowledge of AI. In Ethics for Artificial Intelligence students will deep dive into the complex social challenges that the deployment of AI introduces into a range of fields such as business, security, and transportation. Students will learn formal techniques for examining the ethical dimensions of AI, so that they can make better informed decisions when designing AI solutions. Alongside this, students will continue their dissertation research which will conclude in this term.

Overall, the programme provides students with an excellent opportunity to improve their skillset, expand their technical knowledge and deepen their understanding of Artificial Intelligence and its impact on wider society.

In summary, the distinctive features of the programme include:

1. Learning-by-doing approach to Artificial Intelligence education
2. Professional networking opportunities with postgraduate students from other disciplines
3. Learning focused on popular, cutting-edge areas of Artificial Intelligence

Programme aims	
·	<b>To produce graduates who can apply Artificial Intelligence skills and knowledge to engineer technical solutions to real-world challenges</b>
·	<b>To improve student understanding of the ethical impact of Artificial Intelligence engineering decisions across a broad range of spectrums</b>
·	<b>To support and encourage the development of an innovation mindset</b>
·	<b>To enable students to identify professional development goals that may lead them into future career opportunities</b>
·	<b>To support students in developing a professional network via interactions with peers, tutors and other professionals, that may provide future value and support to them as their career develops</b>
·	<b>To encourage students to understand and embrace the concept of becoming a lifelong learner</b>

Programme Learning Outcomes	
<p>The course provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas.</p> <p>On completion of the course students will be able to:</p>	
<b>LO 1 Research/Inspiration</b>	
<p>Select and evaluate information-gathering techniques using a wide range of sources, providing visual, contextual and industry case-study research as appropriate.</p> <p><b>Related Principle: ORIGINATE</b></p>	
<b>LO 2 Concept/Ideation</b>	
<p>Critically appraise and evaluate appropriate research materials to generate workable concepts or strategic project themes that inform and underpin project development.</p> <p><b>Related Principle: ORIGINATE</b></p>	
<b>LO 3 Development/Prototyping</b>	
<p>Investigate potential pathways that result in appropriate solutions, informed by a systematic understanding of the principles of the creative process.</p> <p><b>Related Principle: INTEGRATE</b></p>	
<b>LO 4 (Pre) Production</b>	
<p>Demonstrate systematic working knowledge, production skills, selection, application and understanding of a selection of processes, materials and methods that inform creative and academic practice.</p> <p><b>Related Principle: COLLABORATE</b></p>	
<b>LO 5 Presentation /Storytelling For Influence</b>	
<p>Communicate projects creatively and professionally, whether in visual, oral or written form. Methods of presentation are appropriate to the audience/client and the purpose of the work.</p> <p><b>Related Principle: ADVOCATE</b></p>	
<b>LO 6 Critical And Creative Mindsets</b>	

Evaluate a range of critical approaches in order to form an independent position
<b>Related Principle: ORIGINATE</b>
<b>LO 7 Employability</b>
Effectively employ professional transferrable and employability skills, including the ability to manage time and work to clear briefs and deadlines, respond to set goals, and communicate effectively.
<b>Related Principle: CULTIVATE</b>
<b>LO 8 Professional Identity</b>
Align your professional identity as a practitioner with a viable career context.
<b>Related Principle: CULTIVATE</b>

Learning and Teaching Methods	Assessment Strategy
<p><b>Formal learning and teaching methods applied on this programme will predominantly take the form of:</b></p> <ul style="list-style-type: none"> <li>• Lectures</li> <li>• Practical Labs</li> <li>• Seminars</li> <li>• Research Projects</li> <li>• Tutorials (Group and Individual)</li> </ul> <p>These methods will be applied across the programme in keeping with wider established practices in the field of Artificial Intelligence education. Other methods may be applied as curricular enhancements, as deemed appropriate by the delivery team. These may include:</p> <ul style="list-style-type: none"> <li>• Flipped classroom activities</li> <li>• Live industry projects and/or briefs</li> <li>• Guest speaker talks</li> <li>• Hackathons</li> </ul>	<p>An appropriate range of assessment methods will be used across the programme. Portfolios are used for several assessments. In the context of Artificial Intelligence these will normally consist of some form of practical work and may optionally include some form of written report. For example, a piece of Artificial Intelligence software (practical) may be accompanied by formal ethical evaluation of the engineering approach (written). Portfolios are selected for summative assessment since they may be assessed holistically. The mark is derived from the relationship between the elements rather than based on each single element considered in isolation. This gives the lecturer the optimum opportunity to mark to reward while providing meaningful feedback to help the student develop.</p> <p>Aside from portfolios, other common assessment strategies will predominantly include:</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Presentations</li> <li>• Engineering Projects</li> </ul> <p>Summative and formative assessment will be given in line with university regulations. Within Computer Science, formative assessment will play a key part in helping students orientate and calibrate their skills. This may take place through class-based exercises and through activities in the Virtual Learning Environment (VLE). For example, lecturers may present quizzes in the</p>

	VLE that allow students to undertake simple exercises to test their memory of material covered in class.
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Unit Code	Unit Title	Credits
<b>Level 7</b>		
<b>1</b>	Artificial Intelligence Foundations	15
<b>2</b>	Mathematics for Data Analysis	15
<b>3</b>	Programming for Artificial Intelligence	15
<b>4</b>	Innovation and Responsibility	15
<b>5</b>	Machine Learning	15
<b>6</b>	Business Development	15
<b>7</b>	Problem Solving with AI	15
<b>8</b>	Ethics for Artificial Intelligence	15
<b>9</b>	Dissertation Project	60
		<b>180</b>

*Yellow highlighted modules are shared modules as discussed in the introduction to this document*

### Entry Requirements

Students will normally be expected to have a 2:1 or above in an undergraduate degree in Computer Science, Data Science, Mathematics, Statistics or a related field. Alternatively, professional experience working in a relevant field may also make a candidate eligible for study on this programme.

Where an applicant's first language is not English, proof of competence in English will be required. For undergraduate and postgraduate programmes, this will normally take the form of an approved English language test at B2 level in the Common European Framework of Reference. Any test for proficiency in English must have been achieved within 18 months preceding the date of entry. Individual programmes may have higher language requirements. Ravensbourne's international department will advise applicants on the language requirements for particular programmes.

### Selection Criteria

Ravensbourne will use a number of methods to assess an applicant's suitability for their course of choice. Primarily applicants are selected on the basis of:

- an applicant's prior academic achievement/qualifications and/or previous employment/life experience;
- assessment of the applicant's ability and aptitude to succeed on the course for which s/he has applied.

Students will be selected according to the generic criteria set out below:

#### Personal attributes

- shows commitment, enthusiasm and interest in the subject area
- initiative and problem solving
- ability to communicate

#### Creative process

- can generate ideas and use external sources to develop them

- ability to research an idea and follow it through to a finished product

#### Study skills

- can understand and organise information clearly
- can investigate and analyse information
- shows reasoning and intellectual curiosity

#### Professional skills

- has shown they can initiate and deliver projects
- can work in a team and with people with different skills
- has shown confidence with IT

#### Career aspirations

- understands the relevance of the course to her/his career ambitions
- understands current debates within industry

### Accreditation of Prior Learning

Applications are welcomed from those who may not possess formal entry qualifications, mature students, those with work experience or with qualifications other than those listed above. Such applicants should demonstrate sufficient aptitude and potential to complete the course successfully. Applicants will be assessed at interview in accordance with Ravensbourne's Accreditation of Prior Learning Policy and Procedure.

**Student Support** <http://intranet.rave.ac.uk/display/SS/Student+Support>

**Assessment Regulations** <http://intranet.rave.ac.uk/display/RA/Assessment+-+UG+and+PG>

The following table maps the MSc Artificial Intelligence LOs to modules. Programme LOs are given in keeping with the requirements of the form. The specific LOs are given after the following table. The given LOs will be translated into unit level outcomes in keeping with the Ravensbourne's move to unit level LOs.

Level 7									
Course LOs	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
LO 1	X	X	X		X		X	X	
LO 2	X	X	X		X		X	X	
LO 3	X	X	X		X		X	X	
LO 4				X		X			X
LO 5				X		X			X

LO 6									X
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**Computer Science LOs derived from QAA Computing Benchmark (Postgraduate):**

1. Critically apply tools and technical skills to identify, model, and engineer Artificial Intelligence.
2. Use established concepts and techniques from the study of Artificial Intelligence to propose and analyse solutions to a range of engineering challenges.
3. Solve a range of current and emerging challenges, demonstrating critical selection, evaluation and application of Artificial Intelligence tools and techniques.
4. Select and apply formal processes to evaluate ethical considerations informing the application of Artificial Intelligence to real world challenges.
5. Evaluate, refine, and apply comprehensive analytical and technical skills to solving a significant Artificial Intelligence related challenge.
6. Define a significant Artificial Intelligence challenge, and professionally manage a process of work to propose and execute a viable solution to it using a recognised project management strategy.

### Description of the Course

*This section will also be used for other purposes, such as prospectus, marketing, website etc.*

#### **MSc Artificial Intelligence**

If you are a Computing, Data Science or Mathematics graduate or professional seeking to expand your skills and knowledge to encompass Artificial Intelligence, then this is the programme for you. The curriculum takes a practical approach, covering modules in Artificial Intelligence Foundations, Mathematics for Data Analysis, Programming for Artificial Intelligence, Machine Learning and Ethics for Artificial Intelligence. Alongside these technical modules, you will undertake modules in business, innovation, and responsibility, which will be shared with students from sister programmes in Computer Science, Cyber Security, and Data Visualisation. Through this, you will gain the opportunity to meet students from other specialisms, and expand your professional network as well as your expertise. Through all this, the aim is to equip with you with the skillset and mindset required to work across a range of fields in order to design solutions to real-world challenges.

#### **Why Study This Course?**

Ravensbourne has an established international reputation for innovation at the intersection of design and digital media. The MSc Artificial Intelligence programme capitalises on and consolidates these past successes, offering you an education that nurtures your ability to innovate while developing your skills and knowledge of Artificial Intelligence.

The programme also aims to promote networking among Masters students from different fields and backgrounds. In so doing the aim is to help you increase the size and diversity of your professional network, in order to maximise your chances of future career success.

**Career opportunities**

A wide range of technical and non-technical roles are available to Artificial Intelligence graduates. Common career trajectories include:

- AI Engineer
- Data Scientist
- Data Analyst
- AI Developer
- Games Programmer
- Robotics Scientist
- Machine Learning Engineer

## Academic Framework – Course Diagram

Term 1	Term 2	Term 3
<b>Artificial Intelligence Foundations</b> 15 credits	<b>Machine Learning</b> 15 credits	<b>Problem Solving with AI</b> 15 credits
<b>Mathematics for Data Analysis</b> 15 credits	<b>Business Development</b> 15 credits	<b>Ethics for Artificial Intelligence</b> 15 credits
<b>Programming for Artificial Intelligence</b> 15 credits	<b>Dissertation Project</b> 60 credits	
<b>Innovation and Responsibility</b> 15 credits		