

A glowing blue circle with the letters 'AI' in white, centered on a dark blue background with a circuit board pattern.

**AI**

# Drive the Future of AI

Artificial Intelligence MSc

Online

Curriculum



UNIVERSITY OF LEEDS



## Introduction

This innovative MSc course is designed and taught by computer scientists specifically for professionals who recognise the importance of AI to their sector. The MSc course is purely AI focused, covering an extensive range of AI and Machine Learning tools and techniques. All the modules speak directly to the skills that employers are actively seeking within the AI development sector.

### This course is designed specifically for those:

- Looking to reskill to enter the AI developer profession.
- Looking upskill in order to develop, manage or plan AI solutions within their current organisation.
- With solid mathematical or statistical knowledge and minimum of calculus, algebra and linear fundamentals.
- Seeking a route to higher level study to develop academic prowess further within this field.
- From a wide range of professional careers including: Professor, Politician, Senior Manager or CEO and Sales and Marketing.

The MSc pathway consists of three foundation modules (15 credits), six development modules (15 credits) and a project (45 credits).

## Foundation Modules (Each 15 credits)

### Programming for Data Science

The module is designed to give those with little or no programming experience a firm foundation in programming for data analysis and AI systems. If you have substantial prior programming experience, this module will also fully stretch you to extend your programming and system-building knowledge. You will understand how software is used for data analysis and AI and design, build and test computer programmes in Python.

### Data Science

This module seeks to help you understand methods of analysis that gain insights from complex data. The module covers the theoretical basis of a variety of approaches, placed into a practical context using different application domains. This enables you to understand the work of a data scientist and the issues relating to data governance. You can then apply problem-solving skills to analyse data and communicate findings for given scenarios.

### Algorithms

This module seeks to give you an understanding of some fundamental data structures and the principles of algorithm design. You will implement and analyse some fundamental algorithms, as well as understanding the standard algorithms for sorting and searching. Using computational geometry and cryptography, you will also understand the difference between polynomial and exponential time algorithms.

## Development Modules (Each 15 credits)

### Knowledge Representation and Reasoning

You will learn how to use an automated reasoning software tool to compute inferences from logical representations. You will also be introduced to informal descriptions of complex real-world scenarios and understand the principles of automated reasoning and the power limitations of different representations and inference mechanisms. Finally, you will understand what an Ontology is and how it can be used within an information system and be able to create simple ontologies using a software tool.

### Ethics of Artificial Intelligence

We are facing a technological revolution. This means the combination of automation and machine learning may take many consequential human decisions and delegate them to computer algorithms. Therefore, this module will teach you the analytical and theoretical tools to engage with the ethical questions that this raises, such as: Who is morally responsible when an automated system makes a mistake? You will apply the academic skills learned in the module to real-world issues and case studies in AI.

### Machine Learning

Using studies of robotics and computer vision, you will use existing implementations of machine learning algorithms to explore data sets and build models. By the end of this module, you will be able to list the principal algorithms used in machine learning and derive their update rules. This will enable you to appreciate the capabilities and limitations of current approaches and evaluate the performance of machine learning algorithms.

### Data Mining and Text Analytics

During this module, you will study the theory and terminology of empirical modelling of natural language and appreciate why unrestricted natural language processing is still a major research task. You will be able to demonstrate familiarity with some of the main text mining and analytics application areas and understand and use algorithms, resources and techniques for implementing and evaluating text mining and analytics systems.

### Deep Learning

This module introduces the field of Artificial Intelligence (AI), taking a state-of-the-art approach based on deep neural networks. In line with the use of AI in key sectors, there is an emphasis on the combination of multiple input modalities – specifically, combining images, text and structured data. You will gain hands-on experience in developing AI systems to address real-world problems, providing the knowledge and skills necessary to develop an AI system.

### Robotics

During the Robotics module, you will be provided with a firm understanding of the fundamental concepts in modern robotics including robot navigation and manipulation. You will understand the structure of software systems and fundamental algorithms used on modern robots.

### Artificial Intelligence Project

(45 credits)

The Artificial Intelligence project enables you to apply your academic study, techniques and knowledge acquired from the course to develop AI solutions to the real world in your current role. This will allow you to address a work-related challenge, encouraging you to explore, analyse, and innovate upon existing critical theory and practice.

For more information about the course and how to apply to study on the online Artificial Intelligence course, please email [studentenquiries.online@leeds.ac.uk](mailto:studentenquiries.online@leeds.ac.uk), or call +44 (0) 113 341 1262 to speak to a member of our Enrolment Team.