Imperial College London

MSc Artificial Intelligence

This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.

Programme Information

Programme Title	Artificial Intelligence
Award(s)	MSc
Programme Code(s)	G5T1
Awarding Institution	Imperial College London
Teaching Institution	Imperial College London
Faculty	Engineering
Department	Computing
Main Location of Study	South Kensington Campus
Mode and Period of Study	MSc: 12 months full-time
Cohort Entry Points	Annually in October
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Awards in Engineering

Total Credits	MSc	ECTS:	90	CATS:	180

FHEQ Level	Level 7 - Master's
EHEA Level	2nd cycle
External Accreditor(s)	None

Specification Details

Student cohorts covered by specification	2022-23 entry
Person Responsible for the specification	Dr Anandha Gopalan
Date of introduction of programme	2019-20
Date of programme specification/revision	January 2023

Programme Overview

This is an MSc degree for graduates of disciplines with a large mathematics component, such as degrees in Mathematics, Physics and some Engineering. The programme includes intensive training in programming and basics of AI, with a number of bespoke modules, a module in the ethics of AI, together

with specialised elective modules, a specialised group project allowing students to develop realistic applications, with industrial input, and a large specialised individual project.

To provide some context: In October 2017 the government published a report on "*Growing the Artificial Intelligence Industry in the UK*", *https://www.gov.uk/government/publications/growing-the-artificial-intelligence-industry-in-the-uk*. It stated the following:
"Skilled experts are needed to develop AI, and they are in short supply. To develop more AI, the UK will need a larger workforce with deep AI expertise, and more development of lower level skills to work with AI." "The UK has an exceptional record in key AI research. Growing the UK's AI capability into the future will involve building on this with more research on AI in different application areas, and coordinating research capabilities."

All software packages required to undertake this degree programme are provided to the students as part of the programme fee.

We use digital technology to bring further benefits to our education programmes, drawing from investments made and skills gained during the pandemic. We deliver our education as a useful blend of face-to-face and digital learning. This will also prepare our students well for a more hybrid work culture of the future.

Learning Outcomes

- To implement modern statistical machine learning methods
- To master the logical foundations of AI and use them in applications and evaluation of different solutions
- To apply programming to a variety of AI example involving techniques such as reinforcement learning, deep learning, statistical machine learning, logic-based knowledge representation and reasoning
- To develop insight into the problems involved in applying a variety of AI techniques (such as reinforcement learning, etc) to deal with real world data and scenarios
- To identify suitable tasks to which AI techniques can be applied
- To compute and implement solutions
- To evaluate the effectiveness of a particular implementation
- To understand the ethical and social issues related to AI, to evaluate them with respect to the topics they study, and to apply them in the context of their own project work
- To apply and adjust techniques to realistic applications

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements

Academic Requirement	1st class honours in Mathematics, Physics, Engineering or other degree with substantial mathematics content
English Language Requirement	Higher requirement Please check for other Accepted English Qualifications

The programme's competency standards documents can be found at:
http://www.imperial.ac.uk/computing/prospective-students/courses/competence/

Learning & Teaching Strategy

Scheduled Learning & Teaching Methods	• Lectures • Tutorials

	• Laboratory • Seminars
E-learning & Blended Learning Methods	• Laboratory
Project Learning Methods	• Group project • Individual project

Assessment Strategy

Assessment Methods	• Coursework • Laboratory exercises • Laboratory-based examinations • Paper-based examinations

Academic Feedback Policy

We will follow the procedures of all our other taught programmes. The department operates in accordance with the College policy on academic feedback.

Feedback will normally be provided on coursework within two weeks of submission. This will be in the form of, for example:
- Marked-up coursework, laboratory exercises or tests
- Personal discussion
- Discussions in small-group tutorials
- Verbal presentation, e.g. during or after lectures
- Written class-wide summaries

In lieu of feedback on examinations, selected examination questions are routinely set as unassessed problems in later years, with model answers provided.

Re-sit Policy

One resit is allowed per module, usually in the next instance when that module is examined. Determinations of results and mitigations will follow college policies and the academic regulations
The College's Policy on Re-sits is available at: http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Programme Structure					
Full-time	Pre-session	Term One	Term Two	Term Three	Term Four
Compulsory Modules	0	3	2	0	0
Elective Modules	0	2 or 3	3 or 2	0	0
Projects (Core)	0	0	0	1	0
Assessment Dates & Deadlines					

Written Examinations	December, January, March, May
Coursework Assessments	Continuous
Project Deadlines	Mid-September
Practical Assessments	Continuous

Assessment Structure

Rules of Progression

n/a

Marking Scheme

Students do 4 compulsory modules and one group project all at level 7, and 5 elective modules. These all have the same ECTS values.

We will also follow the College Academic Regulations for the determination of Pass/Merit/Distinction classifications and the contribution of the cores and electives and level 6 and 7 modules and the individual project.

Indicative Module List
In addition to the Core and Compulsory modules, you much choose 5 elective modules. Between 4 and 5 of the electives can be from Group S (Selective) and at most 1 can be from Group O (Optional).

Code	Title	Core/ Elective	Term	L&T Hours	Ind. Study Hours	Place-ment Hours	Total Hours	% Written Exam	% Course-work	% Practical	FHEQ Level	ECTS
COMP97123	Python Programming	Compulsory	1	28	97	0	125	80	20	0	7	5
COMP97124	MSc Software Engineering Group Project	Compulsory	1,2,3	28	97	0	125	0	100	0	7	5
COMP97125	Ethics, Privacy, AI in Society	Compulsory	2,3	28	97	0	125	0	100	0	7	5
COMP97150	Introduction to Symbolic Artificial Intelligence	Compulsory	1	28	97	0	125	80	20	0	7	5
COMP97151	Introduction to Machine Learning	Compulsory	1	28	97	0	125	70	30	0	7	5
COMP97127	Individual Project	Core	3	200	800	0	1000	0	100	0	7	40
COMP96007	Computer Vision	Elective (S)	1	28	97	0	125	80	20	0	6	5
COMP96019	Robotics	Elective (S)	2	28	97	0	125	70	30	0	6	5
COMP97143	Reinforcement Learning	Elective (S)	1	28	97	0	125	50	50	0	7	5
COMP97055	Computational Optimisation	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97065	Mathematics for Machine Learning	Elective (S)	1	28	97	0	125	70	30	0	7	5

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COMP97067	Modal Logic for Strategic Reasoning in AI	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97105	Machine Learning for Imaging	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97057	Quantum Computing	Elective (O)	2	28	97	0	125	80	20	0	7	5
COMP96005	Logic-Based Learning	Elective (S)	2	28	97	0	125	80	20	0	6	5
COMP97111	Deep Learning	Elective (S)	2	28	97	0	125	50	50	0	7	5
COMP97059	Knowledge Representation	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97061	Probabilistic Inference	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97025	Computational Finance	Elective (O)	1	28	97	0	125	80	20	0	7	5
COMP97045	Principles of Distributed Ledgers	Elective (O)	2	28	97	0	125	50	50	0	7	5
COMP97115	Natural Language Processing	Elective (S)	2	28	97	0	125	80	20	0	7	5
COMP97157	Robot Learning	Elective	2	28	97	0	125	70	30	0	7	5

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		(S)										
COMP97073 M0578	Introduction to C++ Programming	Extracurricular	See module leader								7	N/A

Supporting Information
The Programme Handbook is available at: TBC
The Module Handbook is available at: TBC
The College's entry requirements for postgraduate programmes can be found at: https://www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/
The College's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
The College's Academic and Examination Regulations can be found at: https://www.imperial.ac.uk/about/governance/academic-governance/regulations
Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine". http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/
Imperial College London is regulated by the Office for Students (OfS) https://www.officeforstudents.org.uk/