UNIVERSITÀ
DEGLI STUDI
DI MILANO

Master's degree programme in

Artificial intelligence for science and technology

facoltà di

SCIENZE E TECNOLOGIE

The master's degree programme in Artificial Intelligence for Science and Technology is jointly organised by the University of Milan, the University of Pavia and the University of Milano-Bicocca, its administrative headquarters. Taught in English, it is specifically designed to train master's degree graduates specialising in advanced aspects of the theoretical foundations, techniques, methodologies and ways of using artificial intelligence in complex applications. Lectures will be held at the three universities.

Objectives

The programme offers a 360-degree and interdisciplinary approach to studying artificial intelligence. Students will learn to apply AI effectively in the pursuit of innovative solutions within the fields of science and technology. Over the course of their studies, they will tackle advanced issues in computer science, mathematics, statistics, and physics, whilst gaining an understanding of business administration, management, and the legal aspects of AI, which are then immediately put into practice through one of the individual tracks of study.

Career prospects

Master's graduates will be able to work in the design, implementation and management of IT systems, as well as coordinate and lead work groups in the fields:

- industrial and manufacturing processes, and environmental management;
- embedded smart systems for various areas of application, including consumer electronics, medical devices and systems, prosthetics, motor vehicles, and transport;
- signal and image processing systems for use in healthcare and the environment;
- modeling of complex physical systems, and processing of data using quantum technologies.

In particular, the master's graduates will be able to make use of their skills on artificial intelligence methodologies and techniques honed for the chosen track of study:

- for the control and automation of manufacturing processes, for ensuring product quality levels, and for environmental monitoring;
- to develop intelligent adaptive behaviours, and cultivating organic interactions between humans and machines;
- for collecting and analysing multi-sensor data, both in the field of environmental monitoring through observations of the Earth and sensor networks, as well as in the healthcare arena, providing decision-making support through the analysis of biomedical images and signals;
- for the identification, modeling, and analysis of complex physical systems (including quantum systems), as well as for the processing of information using quantum techniques.

This activity can be carried out, even as a freelance profession, in all areas of the private and public sector that operate in the industrial, environmental, biomedical, automotive, transportation, manufacturing, and advanced material production fields, as well as research bodies and universities for technical support for research and experimentation activities in the areas of knowledge and skills of the chosen professional profile.

Degree syllabus

1st Year

COMPULSORY LEARNING ACTIVITIES	ECTS
Advanced foundations of mathematics for AI	6
Advanced foundations of statistics for AI	6
Advanced foundations of Physics for AI	6
Advanced foundations of artificial intelligence	12
4 Professional skills training *(students may choose from a set of suggested classes in one of the 4 tracks)*	30

2nd Year

COMPULSORY LEARNING ACTIVITIES	ECTS
Data-driven organizations and management	6
Advanced foundations of law and regulations in privacy and data protection	6
1 Professional skills module in a complementary area *(students may choose from a set of suggested classes in one of the 4 tracks)*	6
Electives	12
Additional language skills	3
Academic and pre-professional internships (internship undertaken to prepare the student's Master's thesis)	6
Final exam	21

Students can choose **one of the following 4 tracks:**

Track 1 - Specialist in artificial intelligence for industry and the environment

1ST YEAR	ECTS
Systems for industry 4.0 and environment (IoT)	6
Advanced data management and decision support systems	6
Advanced artificial intelligence, machine learning and deep learning	6
Sensing and vision for industry and environment	12

2ND YEAR	ECTS
Intelligent monitoring and control systems	6
Environmental monitoring and management	6
Privacy and data protection	6

Track 2 - Specialist in artificial intelligence for embedded smart systems

1ST YEAR	ECTS
Embedded systems architectures and design	6
Advanced data management and decision support systems	6
Advanced artificial intelligence, machine learning and deep learning	6
Ambient intelligence	12

2ND YEAR	ECTS
Embedded systems for biomedical applications	6
Intelligent consumer technologies	6
Privacy and data protection	6
Artificial vision	6

Track 3 - Specialist in sensing and signal/image processing for healthcare and environment

1ST YEAR	ECTS
Advanced computational techniques for big imaging and signal data	6
Machine learning for modelling	12
Signal and imaging acquisition and modelling in healthcare	6
Signal and imaging acquisition and modelling in environment	6

2ND YEAR	ECTS
Physical sensors and systems for biomedical signals	6
Physical sensors and systems for environmental signals	6
Physical sensors and systems for biomedical imaging	6
Physical sensors and systems for environmental imaging	6

Track 4 - Specialist in complex systems and quantum technologies

1ST YEAR	ECTS
AI models for physics	6
Machine learning for modelling	12
Statistical learning	6
Foundations of quantum computing	6

2ND YEAR	ECTS
Advanced statistical mechanics and disordered systems	6
Quantum information and algorithms	6
Statistical mechanics of neural networks	6
Quantum computers and technologies	6
High-perfomance computing for AI applications in physics	6

Regulations

The official rules and regulations of the programme are available on the course website.

Applications and admissions

The AI4ST Master's degree programme is open to all eligible students (there is no cap on enrolment).
To be admitted, students should hold a Bachelor's degree, have completed 30 credits in science, have English-language profiency at or above a B2 level, and fulfill some additional requirements on the final graduation grade and the credits in some disciplines (see the call for applications for details). The adequacy of academic preparation will be assessed through an interview.

INFO

WEBSITE OF THE PROGRAMME

https://en.unimib.it/graduate/artificial-intelligence

Contacts: ai4st@unimib.it

Disciplinary classification: Techniques and methods for the information society (LM-91)

Duration: 2 years (120 ects)

Attendance: Highly recommended

Locations:
- Università degli Studi di Milano
- Università degli Studi di Milano Bicocca
- Università degli Studi di Pavia

Useful websites:
orientamento.di.unimi.it
www.unimi.it/it/corsi/laurea-magistrale/artificial-intelligence-science-and-technology

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For further information: www.unimi.it - Education