

What do we mean today when we say Artificial Intelligence?

The intelligence demonstrated by machines is far different from the natural intelligence inherent in humans. Broadly speaking, we can say that current AI concerns the ability of an artificial system to interpret external data, learn from such data, and use that knowledge to perform tasks and achieve specific goals through flexible adaptation.

One of the fastest-growing areas in data-driven AI is machine learning. The enormous amount of data available in our modern world cannot be classified and analyzed by humans; we need algorithms that can detect patterns and make predictions without human supervision. Machine learning is contributing greatly to natural and social sciences, and it is a multidisciplinary subject in and of itself.

The challenges that await us in AI are broad-based and fantastic: it is truly a remarkable time to be a student in this field! However, students need to learn the basic tools in order to be prepared to make their own contributions. There's no shortcut. They need to know a lot about the fundamentals: mathematics, computer science, and the modelling methods of physics and economics. They need all the methodological tools that will allow them to analyze complex systems.

WHAT IS ARTIFICIAL INTELLIGENCE ABOUT?



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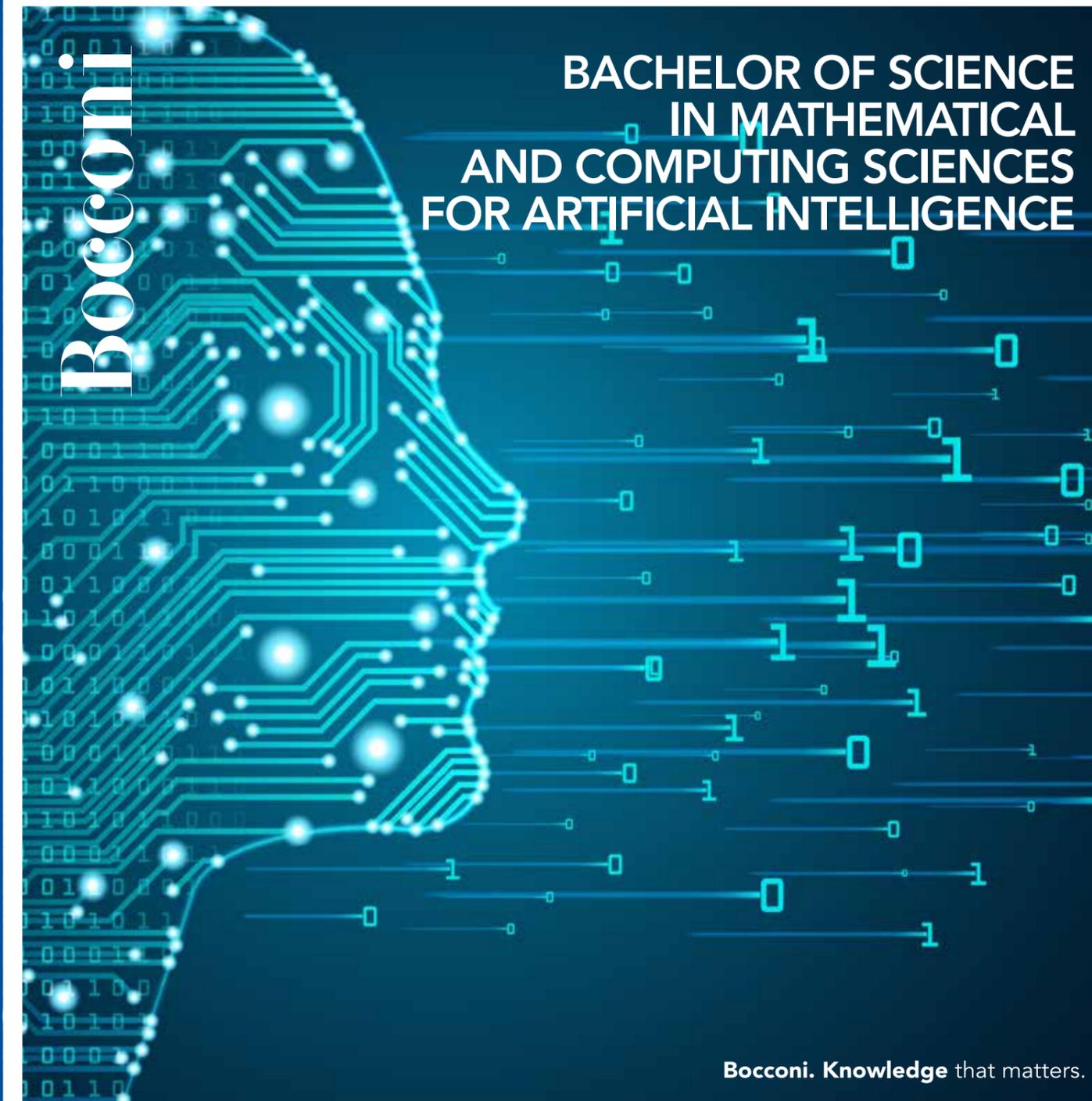
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Bocconi

BACHELOR OF SCIENCE IN MATHEMATICAL AND COMPUTING SCIENCES FOR ARTIFICIAL INTELLIGENCE



Bocconi. Knowledge that matters.



“Artificial intelligence is speeding up the process of making new discoveries across all sciences. And AI is a multidisciplinary science itself.”

RICCARDO ZECCHINA
Program Director

WHAT IS THIS BACHELOR OF SCIENCE PROGRAM ABOUT?

In developing the BSc in Mathematical and Computing Sciences for Artificial Intelligence, we at Bocconi University have chosen to view the challenges of AI as an opportunity to blend diverse realms of science in new ways. Our program stands at the point where several fields converge: mathematics, computer science, physics, and economics. All these various disciplines are crucial to the understanding and to the development of artificial intelligence tools, and to model complex realities that are stored in the vast sets of data available today. Those who master such knowledge can expect a satisfying career as they lead a more complete and rational investigation into the empirical world, creating new knowledge, building new bridges, opening new vistas.

Artificial Intelligence has the potential to make order out of the submerged data iceberg of which we can see only the tip. With that complete picture modelled and analyzed, companies, institutions and society will progress more rapidly and more safely, and graduates of the BSc in Mathematical and Computing Sciences for Artificial Intelligence will be prepared to play a key role in that advancement.

PROGRAM STRUCTURE

FIRST YEAR

MAIN TOPICS

- Mathematical Analysis
- Computer Science
- Algebra and Geometry
- Probability
- Foundations of Physics I
- Foundations of Economics

First-year courses characterize this Bachelor of Science from the very beginning as a truly rigorous interdisciplinary degree. Within a unified framework, the aim is to give you a modern education in the concepts and methods of four major disciplines: mathematics, computer science, the core concepts of classical physics and the main ideas and categories of economics.



SECOND YEAR

MAIN TOPICS

- Advanced Analysis and Optimization
- Advanced Programming and Optimization Algorithms
- Mathematical Modelling in Machine Learning
- Foundations of Physics II
- Decision Theory and Human Behaviour
- Mathematical Statistics

Foreign language
AI Laboratory
Seminars in Digital Ethics and Behavioural Skills

In the second year, your preparation will grow to become a coherent mix of the mathematical, computational and modelling skills that are essential in the new digital era. While deepening your analytical skills and notions in programming and algorithms, you will be introduced to modern physics using advanced mathematical analysis. You will also learn the formal modelling of human decision making, with its applications to the economics of risk and uncertainty. At the same time, you will learn the basic models and techniques of machine learning. The AI Lab and the seminars on Digital Ethics and Behavioural Skills will introduce you to specific applications and give you some soft skills that are important in academic and professional worlds.

THIRD YEAR

MAIN TOPICS

- Machine Learning for Artificial Intelligence
- Stochastic Processes and Simulations in Natural Sciences
- Statistical and Quantum Physics
- Game Theory and Mechanism Design
- Mathematical Modelling for Finance
- Mathematical Modelling for Neurosciences

Electives
Exchange program / Internship
Final paper

In the third year, courses will blend mathematical, computing and modelling skills, with more than a glimpse in the direction of modern data-driven AI challenges through an advanced course in machine learning for AI. You will see some advanced computing tools and methods while learning the fundamentals of simulation and numerical methods, with their applications to natural sciences. Advanced mathematical and algorithmic tools are essential to model complex physical systems; you will also learn the formal modelling of human interactions, a topic that underlies much of modern economics and plays a key role in computer science. Finally, you will be introduced to the study of cognitive processes and their key role in understanding artificial and human intelligence. A wide choice of elective courses will allow you to dive deeper into your favorite subjects.

AFTER GRADUATION

After this BSc program, most students will continue their studies with a graduate program. This program is, indeed, an appropriate choice if you would like to complete it with an MSc program focused on Artificial Intelligence, Applied Mathematics, Computer Science, Data Science, Physics, Economics, Finance, or Management, in Italy or abroad.

You may also access the job market, typically with a junior professional profile as an expert in mathematical, computational, modelling and AI methods. You will mainly work on teams, creatively using mathematical, computational, modelling and AI methods for the understanding and modelling of complex realities in applied sciences as well as in economics and other fields of social sciences, such as accounting, finance, management and marketing.



LEARN MORE AT
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