SUPSI

Bachelor of Science in Data Science and Artificial Intelligence

With the arrival of digitalisation and the increasingly significant role of data, in virtually all professional sectors the need to combine new multidisciplinary data analyst skills with business or engineering skills is becoming more and more pronounced.

Artificial Intelligence makes it possible to extract knowledge from data, and make decisions automatically or semi-automatically. Its applications include, for example, recognising objects in images, formulating sales forecasts, making recommendations for books/films similar to those we have already enjoyed, executing automatic financial transactions, etc.

Graduates from this program understand the fundamental methods of Artificial Intelligence and Data Science, and can implement these methods, deploying them, for example, in companies with large amounts of data and that want to implement data-driven decision making (banks, financial and marketing institutes, insurance companies, public bodies, manufacturing industries, pharmaceuticals, the service sector, and the medical / biological sectors).

• **Study and practice**
  In each course, preference is given to active learning through practical exercises and laboratories, as well as project work. Interactions between courses carried out both in series and in parallel are also promoted, by means of transversal case study analyses. Numerous multidisciplinary and team activities such as data challenges, hackathons and seminars will be proposed.

• **Quality of the education**
  Strong focus on teaching quality, which is constantly monitored and updated. Furthermore, strong links with research activities ensure that the scientific level of the study programme remains consistently high.

• **Career prospects**
  Thanks to the advance of digitalisation and the increasingly significant role of data, the use of AI technologies has nowadays penetrated virtually every industrial sector: from finance (fintech) to biological technologies, from industry 4.0 to the energy sector. The Bachelor program aims to train skilled operators who can assist companies and institutions in this challenge, particularly from the perspective of quantitative data analysis, helping them become more competitive and intensifying their innovation capacity.
Objectives and skills
The Bachelor program emphasises the ability to implement Data Science / Artificial Intelligence algorithms, making them operational within the company and efficiently analysing even large amounts of data (Big Data). In order to achieve a fully-rounded professional profile, in addition to mastering statistical and computer skills, graduates should also acquire expertise in the fields of communications and ethics.

Career opportunities
With the skills acquired during their studies, Data Science and Artificial Intelligence graduates can apply AI techniques and methods, particularly those associated with machine learning, in companies and institutions with large amounts of data and that want to implement data-driven decision making. They can therefore operate in the various data analysis phases (data collection, choice of analysis method, implementation, evaluation of results, evaluation of ethical and privacy implications) and build automatic and efficient machine-learning systems.

Language
Courses are conducted in English. Students may attend some courses in Italian, should these already be scheduled by the Department.

Qualification awarded
Bachelor of Science SUPSI in Data Science and Artificial Intelligence.

First year
Basic sciences: Calculus; Linear Algebra; Probability and Statistics; Numerical Analysis and Optimisation
Professional knowledge: Introduction to Artificial Intelligence; Databases; Operating Environments; Introduction to Computer Programming.
Soft-skills: Ethics and Philosophy of Artificial Intelligence; Communication and Presentation Skills; Project Management; English; Italian Language and Culture (for non-Italian speakers); Group Work.
Challenges, Laboratories and assisted exercises: Hackathons; Data Challenges; Activities related to the basic science and professional knowledge modules.
Second year

Basic sciences: Advanced Calculus and Algebra; student-selected modules.

Professional knowledge: Supervised and Unsupervised Learning; Data Management; Software Modelling; Applied Operations Research; Parallel and Concurrent Programming; Advanced Algorithms; student-selected modules.

Soft-skills: Communications and Report Writing; Data Visualisation; Introduction to vertical domain applications in key areas; Group Work.

Challenges, Laboratories and assisted exercises: Hackathons; Data Challenges; Activities related to the basic science and professional knowledge modules.

Third year

Professional knowledge: Advanced Machine Learning, Deep Learning and Computer Vision; Bayesian Probabilistic Programming; Natural Language Processing and Text Mining; Time Series, Analytics and Forecasting; Big Data Processing; Data Security and Blockchains.

Soft-skills: Ethics, Law and Privacy in Data Analysis; student-selected modules; Group Work.

Challenges, Laboratories and assisted exercises: Hackathons; Data Challenges; Student-selected modules of case studies of machine learning and deep learning in key application areas; Activities related to the basic science and professional knowledge modules.
Admission requirements
Applicants with the following requirements are admitted without further examination:

- School leaving examination from a vocational technical high school linked to the chosen study program;
- Federal high school matura or equivalent qualification. Applicants can choose between two access modes: 1) "SPI" mode, integrated study and practice; "APA" mode, pre-course work experience year;
- ST technician qualification or technician qualification awarded by a high school specializing in a field related to the chosen study program;
- More than 25 years of age and significant training and working experience in the field of the chosen study program.

A minimum English level of B1 is preferred. New students can attend an intensive English language course before the beginning of the first semester. Candidates failing to meet the requirements specified above will be evaluated by an internal commission.

Course type
- Full-time (180 ECTS over three years)

Academic Calendar
September-June.

Application deadline
15 April 2020 (subject to payment of a CHF 100 administration fee).

Course fee
The semester fee amounts to CHF 1,600. This sum is reduced to CHF 800 for students who benefit from the application of the ASUP Intercantonal Agreement for Vocational Universities (Swiss nationality or civil and fiscal domicile in Switzerland or in Liechtenstein). Specific agreements apply for students residing in Campione d’Italia. Contribution to didactic costs: 150 CHF each semester.