# EXTRACT OF THE TEACHING REGULATIONS
## MASTER'S DEGREE IN COMPUTER SCIENCE (LM-18)
## A.A. 2023/2024

*Admission requirements -* The degree program is free access.

*The general curricular requirement* for admission is the possession of a three-year degree in Computer Science (Class 26 or Class L-31), or in Computer Engineering (Class 9 or L-8), or in Mathematics (Class 32 or L-35) or in Physics (Class 25 or L-30). Students with a 3-year Bachelor's degree from another class obtained in Italy or equivalent qualifications obtained abroad can be admitted if they have acquired **at least 72 ECTS (Italian equivalent CFU) credits in the INF/01 or ING/INF-05 sectors or MAT\* or FIS\* of which at least 36 in INF / 01 or INF / ING-05 and at least 18 credits in the MAT \* and FIS \* sectors.** A good knowledge of English is required (Level B2 or higher).

*Admission procedures -* The adequacy of personal preparation, in particular on the foundations of information sciences and technologies and of the English language, is verified by evaluating the training curriculum, and possibly with a test, on specific topics that take into account the guidelines approved by the Department Council on the proposal of the Board of the CdS.

The evaluation and any verification test will be carried out by the President of the CdS or a commission delegated to do so. In the case of three-year graduates in Computer Science (class 26 or class L-31), or in Computer Engineering (class 9 or L-8), this preparation is automatically considered adequate, subject to verification of knowledge of the English language.

*Erasmus –* Students taking part in the ERASMUS project and students who have applied for a transfer from another course of study, or abbreviation or career reunification, should contact: pdswif@di.unipi.it

*Preparatory study –* There are no preparatory courses.

*Degree marks system –* The final mark is determined by summing the average mark for all examinations, weighted with respect to the number of CFUs, an evaluation of the curriculum and the discussion of the thesis.

*Course structure –* The course of study is structured in four curricula. At the time of enrollment in the first year, the student chooses one of the curricula and follows the planned study plan.

If the 9 CFUs of courses in "FREE CHOICE" are NOT chosen from the list of "AFFINI" provided for in the curriculum, the student must be authorized by the Degree Program Board. This authorization request must be sent, within three months before the end degree, to the Study Plans Committee (pdswif@di.unipi.it ) which will deal with the request.

The student can also submit an *individual* study plan that does not fit into any of the curriculum.

Also in this case, the student must be authorized by the Degree Program Board. This authorization request must be sent to the Study Plans Committee (pdswif@di.unipi.it ) which will instruct the practice to assess the consistency of the activities chosen by the student with the organization of the degree course.

| CURRICULUM Big Data Technologies FIRST YEAR | |
|---|---|
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Algorithm Engineering (9) | Advance databases (9) |
| Data Mining (9) | Bioinformatics (6) |
| Computational mathematics for learning and data analysis (9) | Parallel and distributed systems: paradigms and models (9) |
| Information Retrieval (6) | AFFINE (6) |

| SECOND YEAR | |
|---|---|
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| AFFINE (6) | AFFINE (9) |
| AFFINE (9) | |
| FREE CHOICE (9) | FINAL THESIS (24) |
| **AFFINI (6)** | **AFFINI (9)** |
| ICT infrastructures (1s) | ICT risk assessment (2s) |
| Big data analytics (Geospatial Analytics)(1s) | Mobile and cyber physical systems (2s) |
| Scientific and large data visualization (1s) | Machine learning (1s) |
| Peer to peer systems and blockchains (2s) | Human languages technologies (2 s) |
| Social and ethical issues in computer technology (2 s) | |
| Computational models for complex systems (2 s) | |
| 3D Geometric Modeling & Processing (2 s) | |
| Algorithmic Game Theory (2 s) | |
| Laboratory on ICT Startup Building (2 s) | |
| Introduction to Quantum Computing (2 s) | |
| Computational Health Laboratory (2 s) | |

| CURRICULUM Artificial intelligence<br>FIRST YEAR | |
|---|---|
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Artificial intelligence fundamentals (6) | Intelligent systems for pattern recognition (6) |
| Machine learning (9) | Human language technologies (9) |
| Computational mathematics for learning and data analysis (9) | Parallel and distributed systems: paradigms and models (9) |
| AFFINE (6) | AFFINE (6) |
| **SECOND YEAR** | |
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Smart applications (9) | AFFINE (6) |
| AFFINE (9) | |
| FREE CHOICE (9) | FINAL THESIS (24) |
| **AFFINI (6)** | **AFFINI (9)** |
| Information retrieval (1s) | Algorithm engineering (1s) |
| Computational neuroscience (2s) | Data mining (1s) |
| Semantic web (1s) | Mobile and cyber-physical systems (2s) |
| Robotics (2s) | |
| Social and ethical issues in computer technology (2 s) | |
| Computational models for complex systems (2 s) | |
| 3D Geometric Modeling & Processing (2 s) | |
| Algorithmic Game Theory (2 s) | |
| Laboratory on ICT Startup Building (2 s) | |
| Introduction to Quantum Computing (2 s) | |
| Computational Health Laboratory (2 s) | |
| Continual learning (2 s) | |

| CURRICULUM ICT solutions architect<br>FIRST YEAR | |
|---|---|
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Advanced Programming (9) | Peer to peer systems and blockchains (6) |
| Advanced software engineering (9) | Mobile and cyberphysical systems (9) |
| Algorithm Engineering (9) | ICT risk assessment (9) |
| ICT infrastructures (6) | AFFINE (6) |
| **SECOND YEAR** | |
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| FREE CHOICE (9) | AFFINE (9) |
| AFFINE (9) | |
| AFFINE (6) | FINAL THESIS (24) |

| AFFINI (6) | AFFINI (9) |
| --- | --- |
| Information retrieval (1s) | Parallel and distributed systems: paradigms and models (2s) |
| Scientific and large data visualization (1s) | Software validation and verification (1s) |
| Business Process Modeling (1s) | Data mining (1s) |
| Wireless Networks of Embedded Systems (2s) | Machine learning (1s) |
| Algorithmic Game Theory (2s) | Language-based tecnology for security (2s) |
| Laboratory on ICT Startup Building (2s) | Intelligent systems for pattern recognition (2s) |
| Introduction to Quantum Computing (2s) | |

| CURRICULUM Software: programming, principles, and technologies | |
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| FIRST YEAR | |
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Competitive programming and contests (6) | Principles for software composition (9) |
| Languages, compilers and interpreters (9) | Algorithm design (9) |
| AFFINE (6) | AFFINE (6) |
| AFFINE (9) | AFFINE (9) |
| SECOND YEAR | |
| **FIRST SEMESTER** | **SECOND SEMESTER** |
| Software validation and verification (9) | Laboratory for innovative software (6) |
| FREE CHOICE (9) | |
| AFFINE (9) | FINAL THESIS (24) |
| **AFFINI (6)** | **AFFINI (9)** |
| Information retrieval (1s) | Parallel and distributed systems: paradigms and models (2 s) |
| Bioinformatics (2s) | Advanced programming (1s) |
| Foundations of computing (2s) | Smart applications (1 s) |
| ICT infrastructures (1s) | Advanced software engineering (1s) |
| Computational models for complex systems (2 s) | Machine learning (1s) |
| Algorithmic Game Theory (2s) | Computational mathematics for learning and data analysis (1s) |
| Laboratory on ICT Startup Building (2s) | Mobile and cyber-physical systems (2s) |
| Introduction to Quantum Computing (2s) | Language-based tecnology for security (2s) |