DIDACTIC REGULATION OF THE MASTER'S DEGREE COURSE IN COMPUTER SCIENCE

(LM-18 - Informatica)

a.a. 2025/2026

Summary

Art. 1 – General Characteristics and Organisation

The Master's Degree Program in Computer Science – LM-18 - Computer Science (Ministerial Decree of March 16, 2007, revised by DM 1648/23 and DM 1649/23) – is activated according to the 2025 educational regulations and includes a double degree program.

The main goal of the Master's Degree in Computer Science is to train graduates with high-level knowledge and professional skills, capable of designing and managing complex IT systems, and contributing to the advancement of cutting-edge technologies such as Artificial Intelligence and Cyber Security. The graduate's skillset enables them to be highly competitive in a wide range of fields, including self-employment, positions in public administration, employment in companies producing goods and services and in data processing centres (both public and private), as well as research and consulting activities.

All courses are taught in English to enhance international competitiveness and attract students from other countries. To support this, the program includes learning activities to enhance students' English language proficiency.

The program is designed to offer maximum flexibility in defining each student's educational path by limiting the number of mandatory courses and offering a broad range of elective courses that cover several innovative areas of Computer Science. To allow students to specialise in specific fields, the didactic offer includes selective courses organised into two thematic tracks:

- **Data Management, Analysis, and Security**
- **Software Engineering**

These thematic paths meet the growing demand for professionals capable of managing and analysing large amounts of data while ensuring their security and privacy, as well as those skilled in methods, tools, and techniques for quality software development.

A key goal of the Master's Degree is to foster the ability to manage problems and projects independently. Therefore, students are encouraged to undertake project work tailored to their interests and aptitudes during their studies. Significant emphasis is also placed on the thesis, which involves 6 months of dedicated work.

The degree program has been awarded the **GRIN Quality Seal** – a true quality mark for university-level computer science education, issued by the Italian Association of University Professors of Computer Science (GRIN), based on content quality certification.

Double Degree
A cooperation agreement between **Università degli Studi dell'Insubria** and **Université Côte d'Azur** enables the implementation of a joint double degree program in Computer Science. The two universities respectively confer the **Laurea Magistrale in Informatica** and the **Master parcours Informatique et Interactions**.

Students receive training at both Università degli Studi dell'Insubria and Université Côte d'Azur. Participating students benefit from a culturally and academically stimulating environment thanks to long-standing scientific and educational collaborations between the two partner institutions.

The academic department responsible for the program is the **Department of Theoretical and Applied Sciences**.
The Program Director is **Prof. Brunella Gerla**: https://uninsubria.unifind.cineca.it/get/person/000559

The academic office provides support **by appointment** through the **Microsoft Teams platform**, and responds to emails via the **INFOSTUDENTI** system. INFOSTUDENTI is a web application offering a communication channel with various university offices (including Student Services, Financial Aid, Career Services, and Academic Offices). Through this system, users can send inquiries, receive replies, attach documents, and track the status of their requests.

Art. 2 – Academic Calendar of the Degree Program

Teaching activities take place in classrooms located in **Varese** and are delivered entirely in **English**.

The official website of the Degree Program: https://www.uninsubria.it/formazione/offerta-formativa/corsi-di-laurea/informatica-0

The **class schedule** is published under the section:

ORARIO DELLE LEZIONI:

https://www.uninsubria.it/formazione/offerta-formativa/corsi-di-laurea/informatica-0

The **exam schedule** (with dates and times) is published at:

https://uninsubria.esse3.cineca.it/ListaAppelliOfferta.do

The academic calendar is organised into semesters:

- **First Semester** – from 22.09.2025 to 19.12.2025
- **Second Semester** – from 23.02.2026 to 29.05.2025

Exam periods:
from 07.01.2026 to 20.02.2026
from 03.06.2026 to 31.07.2026
from 01.09.2026 to 18.09.2026

To register for exams, students must log into the **Student Web Services** using their university

credentials (username and password of their @studenti.uninsubria.it email account):
Navigate to: **Exams > Exam sessions**; select the desired session and follow the instructions.

The **minimum number of exam sessions per course is 6**.

Students who are up-to-date with enrollment and tuition fees can access exams, provided they have met any prerequisites and attended the relevant classes. Exams are only available for completed courses.

Art. 3 – Orientation Activities

A brief description of the University-wide orientation activities can be found at the following link: https://www.uninsubria.it/formazione/consigli-e-risorse-utili/orientamento

Incoming Orientation

The Orientation Committee of the degree program coordinates the incoming orientation activities. In addition to participating in university-level initiatives, the Master's Degree Program in Computer Science organises dedicated meetings with Bachelor's students, which can also be attended remotely via Microsoft Teams, to present its educational offerings.

- The Computer Science degree program takes part in **Cyberchallenge.it**, the national cybersecurity training program for university and high school students (ages 16 to 24), organised by the **CINI Cybersecurity National Lab**.
- The program also hosts **thematic seminars and workshops** on advanced topics covered in the Master's degree, open to Bachelor's students.

Ongoing Orientation and Tutoring

Within the degree program, certain faculty members serve as **Academic Tutors**, offering a range of services aimed at:

- Guiding and assisting students throughout their academic journey, particularly during the first year, to help them actively engage in shaping their educational path and making informed choices;
- Providing advice on study methods, the benefits of class attendance, and solving specific challenges;
- Removing obstacles to successful course attendance through initiatives tailored to the individual needs, aptitudes, and requirements of each student;
- Supporting students during **laboratory activities**;
- Assisting **incoming international students** participating in mobility programs;
- Providing support and assistance to students with **disabilities and/or specific learning disorders (SLD)**.

Art. 4 - Specific Learning Objectives, Expected Learning Outcomes, and Career Opportunities

The Master's Degree in Computer Science is specifically tailored to train graduates with a solid background in data management and analysis, security, and the software production process, capable of carrying out research and development activities in information sciences.

The program has a single curriculum pathway, structured into the following learning areas:

- **Software Engineering:** including methodologies, life cycle, models and tools for software development, modelling techniques, software evaluation and quality improvement.
- **Data Management, Analysis, and Security:** including the design of data management systems across various architectures, access control and privacy policy tools, and machine learning techniques for data analysis and interpretation.
- **Computation Models and Architectures:** including computation models and formalisms for their description.

The curriculum is designed to provide students in the first year with foundational and cross-disciplinary knowledge in these areas, allowing for a broad personalisation of the educational pathway in the second year. Some courses include independent and group project work to support practical application and develop professional-level skills.

The study program concludes with the preparation of the final thesis, which consists of an original research project carried out with a high degree of autonomy.

The Master's program is taught entirely in English.

Expected Learning Outcomes by Area (Dublin Descriptors)
Software Engineering – Common Area

Knowledge and Understanding
Graduates will have acquired the following knowledge:

- Understanding of software development processes and their intermediate products; basic knowledge of requirements analysis, software verification and validation; understanding of computational and architectural models of information systems.
- Knowledge needed for specifying and managing requirements, from collection to modelling, analysis of various solutions, and specification of the chosen solution.
- Knowledge of the fundamentals of software verification and validation, and software quality assessment; basic techniques for measuring, verifying, and validating software; prediction of software quality based on measurement.
- Knowledge of programming paradigms (imperative, functional, and logic).
- Understanding of concurrent and distributed models (shared memory vs message passing).
- Knowledge of controlled software evolution techniques and processes.

Applying Knowledge and Understanding
These skills will enable graduates to:

- Apply techniques for requirements specification, cost estimation, structural and functional testing; apply computational and architectural paradigms in system definition. Make informed decisions when evaluating software application organisation options and choosing implementation techniques.
- Use various techniques and notations for requirements engineering from collection to final specification.
- Analyse software systems for quality assessment, discern suitable and rigorous techniques and metrics; apply general and specific software validation, verification, and measurement principles; introduce measurement programs even in complex software organisations.
- Recognise and apply different software lifecycle models suited to specific applications and develop process models.
- Apply project management techniques including cost estimation and resource allocation planning using data derived from software characteristics.
- Analyse, assess, and manage risks.
- Use protocols and standards of Service-Oriented Architectures and address related development, integration, and testing challenges (SOAP, REST, Microservices).

Teaching methods include lectures, exercises, and laboratory activities. Content mastery is assessed through written/oral exams, reports, exercises, and project development.

Data Management, Analysis, and Security – Common Area

Knowledge and Understanding
Graduates will acquire knowledge of:

- Security methodologies, risk analysis, threat management; basic knowledge for access control and privacy protection in data management systems (especially relational model), access control models, privacy safeguards including GDPR.
- Techniques for automatic recognition/classification of multidimensional data; statistical methods and limitations; feedforward neural models, flat and hierarchical clustering, competitive learning, self-organising neural networks, fuzzy logic systems, classification accuracy metrics.
- Data mining issues, methods and tools for large-scale data; hardware/software platforms; association rule mining, sequential pattern mining, decision trees, linear classification, SVMs, ensemble methods, learning with incomplete info, collaborative filtering, network data mining.
- Solving business data analysis problems using machine learning and deep learning; data science project architecture in terms of data volume, speed, computation, analysis, implementation, and maintainability.

- Cloud architecture technologies (virtual machines, memory, networks), innovative data models, paradigms (e.g., MapReduce); evaluation of commercial platforms (Azure, AWS); main security and privacy challenges.
- Data models in NoSQL systems; database design approaches, data manipulation and analysis techniques, widely adopted datastores and query languages.
- Data distribution and replication techniques in distributed NoSQL systems, consistency mechanisms, and access control models.
- Multimedia digital signal processing techniques; sampling and quantisation; numerical processing using linear time-invariant systems; frequency-domain signal processing.

Applying Knowledge and Understanding
Graduates will be able to:

- Use SQL for access control (e.g., Oracle DBMS); implement access/privacy requirements; apply risk management strategies in real case studies.
- Choose suitable recognition/classification techniques for multidimensional data; analyse classification method prerequisites.
- Apply statistical techniques for recognition; configure neural models; use clustering; assess self-organising neural networks and fuzzy logic systems; apply classification accuracy metrics.
- Apply data mining methods to real-world large datasets with critical judgment. Learn and evaluate new methodologies.
- Develop business data analysis projects using machine/deep learning; analyse, visualise, and interpret results based on selected problem-solving approaches.
- Define analysis goals, constraints, and assumptions; design and implement data marts (Kimball methodology), performance optimisation, ETL procedures from OLTP to data marts; integrate ETL with data investigation and predictive analytics; design and implement BI dashboards and reports.
- Evaluate cloud computing service quality and design new cloud solutions aligned with current standards.
- Identify and solve professional data management problems in distributed systems; assess database adequacy for application needs.
- Select appropriate NoSQL systems for various applications; design databases for major data models; manage distributed NoSQL systems with replication, access control, etc.
- Apply knowledge of architectures, models, and protocols in distributed ledger systems; solve ledger-related transaction management problems.
- Assess the suitability of a distributed ledger in application contexts.
- Apply signal processing techniques to audio, physiological, and image data; apply signal techniques to intelligent and human-machine systems; critically evaluate results, limits, and potentials.

Teaching methods include lectures, exercises, and laboratory work. Competence is assessed via written/oral exams, reports, practical exercises, and projects.

Models, Architectures, and Specific Applications – Common Area

Knowledge and Understanding
Courses in this area provide an introduction to the main formal models for sequential and parallel computation. Transversal activities such as strengthening English language skills are also included. Graduates will gain knowledge of:

- Computational models: finite automata, nondeterministic Turing machines, cellular automata, Markov chains.
- Formal methods for biological systems, DNA computing and applications.
- Internet of Things paradigm: protocols, standards, and related security/privacy issues.
- Constructs for interaction, communication, and synchronisation between independent processes.
- Structured Operational Semantics: transition system construction via inference rules.
- Formal/logical methods for program verification and control.
- Logic programming paradigm for knowledge representation.
- Enhanced English language proficiency focused on scientific text comprehension and project report writing.

Applying Knowledge and Understanding
Graduates will be able to:

- Formalise, abstract, model, and analyse complex systems/problems.
- Use computation models like automata, Turing machines, cellular automata, and Markov chains.
- Apply formal methods to biological systems.
- Describe interactions and communications between processes.
- Use IoT protocols and standards while addressing security and privacy issues.
- Use formal logic tools for program verification.
- Use declarative logic-based programming languages.
- Manage the content of a research project in English and write a scientific report.

Teaching methods include lectures, exercises, and labs. Competency is assessed via exams, reports, exercises, and project development.

Career Profiles and Job Opportunities

Specialist in Data Management, Analysis, and Security
Responsible for analysing, designing, developing, and maintaining data management and analysis systems, while addressing privacy and security issues. Graduates will take on roles of responsibility and contribute to methodological and technical decisions, proposing innovative solutions.
Employment opportunities:

Companies producing goods/services, IT companies, professional studios, public/private institutions, consulting.

Software Production Process Specialist
Involved in various software development phases for complex problems, from feasibility to deployment, across multiple application contexts. Capable of optimizing efficiency, minimizing risk, and maximizing software quality within constraints. Graduates will take on responsible roles, making both technical and economic decisions, considering both internal and end-user perspectives.
Employment opportunities:
Industries, IT companies, professional firms, public/private organizations, consulting. Particularly useful in organizations developing software or integrating software-based systems.

Researcher in Public and Private Laboratories
Engaged in research across all fields of Computer Science, developing theoretical/methodological and applied innovative solutions. Participate in tech transfer activities.
Employment opportunities:
PhD in Computer Science or Information Engineering. Research and development roles in public/private institutions.

Art. 5 – Admission to the Degree Programme

The admission criteria to the degree program consist of curricular requirements and verification of the adequacy of personal preparation. The student will have access to the verification of the adequacy of the preparation by means of a compulsory interview, once the curricular requirements are acquired.

CURRICULAR REQUIREMENTS
1. Academic Qualification:
Students holding a Bachelor's degree in one of the following classes may be admitted to the Master's Degree Programme in Computer Science:

- Class L-31 (Computer Science and Technology) as per Ministerial Decree 270/04;
- Class L-8 (Information Engineering) as per Ministerial Decree 270/04;
- Class 26 (Computer Science and Technology) as per Ministerial Decree 509/99;
- Class 09 (Information Engineering) as per Ministerial Decree 509/99.

Alternatively, candidates may also be admitted if they hold a degree from other classes or from previous academic regulations, or a three-year University Diploma, or another qualification obtained abroad and recognized as suitable, provided they meet the curricular requirements in terms of a minimum number of ECTS credits in specific academic disciplines [SSD] (or recognized as equivalent by the competent academic body in the case of a foreign or pre-reform qualification under Ministerial Decree 509/99):

- At least 60 ECTS credits earned in SSDs INF/01 and ING-INF/05 (indifferently);
- At least 18 ECTS credits earned in SSDs MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08, MAT/09 (indifferently).

2. Language skills:
To be admitted to the Master's Degree in Computer Science, students must have an adequate knowledge of the English language, corresponding to at least level B2 of the Common European

Framework of Reference for Languages (CEFR).
Language proficiency is considered satisfied if the applicant has passed a university-level English exam of at least B2 level (for example, the English exam included in our Bachelor's Degree in Computer Science curriculum) or holds a recognized international certification at B2 level. This certification must have been obtained within the past five years, except for IGCSE, IELTS, and TOEFL, which are valid for only two years. For the complete list of recognized certifications, please refer to the following link: https://www.uninsubria.it/servizi/tutti-i-servizi/riconoscimento-certificazioni-lingue-straniere-dista

ADEQUACY OF PERSONAL PREPARATION (INTERVIEW):
All students must undergo a mandatory interview to assess the adequacy of their personal preparation. The interview is aimed at verifying that the candidate possesses the essential knowledge and skills typical of the Bachelor's degree classes L-31 (Computer Science and Technologies) and L-8 (Information Engineering) pursuant to Ministerial Decree 270/04.

The interview will be conducted by a dedicated committee composed of faculty members appointed by the Programme Council, according to methods and schedules published on the Programme's website. An unfavourable outcome of the interview precludes admission to the Master's Degree Programme for the academic year in question.
More information available at:
https://www.uninsubria.it/servizi/vivere-insubria/immatricolarsi-e-iscriversi/immatricolazioni/verifica-della-preparazione-12

Art. 6 – Incoming Transfers, Course Changes

Students coming from another university, another programme within this university, or from previous academic regulations may request a transfer or change of course to the Master's Degree Programme. Transfer/change requests will be evaluated by the Programme Council, which will recognize university credits based on the following criteria:

- Analysis of the curriculum and content covered;
- Evaluation of the relevance of the academic disciplines and contents of the educational activities completed during the student's previous academic career, in relation to the specific learning objectives of the programme and its individual components.

The recognition is carried out in accordance with Article 3, paragraphs 8 and 9 of the Ministerial Decree redefining the Degree Classes (March 16, 2007). Credits are recognized up to the amount required by the degree programme.

Recognition page link:
https://www.uninsubria.it/servizi/consulenza-e-supporto/pratiche-studenti/servizi-segreterie-studenti/riconoscimento-di

Art. 7 – Concurrent Enrollment in Two Degree Programmes

Starting from the academic year 2022–2023, students are allowed to enrol simultaneously in two higher education degree programmes, in accordance with Law No. 33 of April 12, 2022 ("Provisions on concurrent enrolment in two higher education programmes") and subsequent Ministerial Decrees (DM 930/2022 and DM 933/2022).
Requests for dual enrolment will be assessed by a dedicated committee of the programme, after verifying that the admission requirements are met.

Art. 8 – Study Plan

The program does not include specific curricula; the study plan includes 5 mandatory courses in the first year. Students must also select 2 courses from those offered in Disciplinary Area B/Computer Science in the first year and 2 in the second year, as well as 1 course from those offered in Disciplinary Area C/Related or Supplementary Activities in the first year and 1 in the second year.
Some courses in these two Disciplinary Areas may be offered in alternate years. The final list of available courses for the academic year will be published when the online study plan submission/editing period opens.
Additionally, students must earn 12 elective ECTS credits in the second year and 30 ECTS credits total for thesis design, thesis preparation, and the final defense.

Enrollment in the Integrated International Study Program (Double Degree)
The program offers the opportunity to participate in a study program in cooperation with the Master parcours *Informatique et Interactions* at Université Côte d'Azur (France).
The partner universities nominate candidates interested in the program. Selected students (maximum 5 per university) are chosen by a joint committee composed of faculty members from both institutions.
Admitted students will obtain a second-level degree from both partner institutions, provided that they meet the respective graduation requirements.
Università degli Studi dell'Insubria and Université Côte d'Azur will award the *Laurea Magistrale in Informatica* and the *Master parcours Informatique et Interactions*, respectively.
This program offers several benefits, including the chance to diversify one's academic experience by attending courses that complement the Master's program in Computer Science at Insubria.
Students will also gain significant international experience, improving language skills, experiencing another country and culture, and acquiring important soft skills in communication and interpersonal relations.
For further information regarding participation and administrative deadlines, visit:
https://www.uninsubria.it/servizi/tutti-i-servizi/doppi-titoli-di-laurea

Attendance Modalities for:

- **Students with disabilities and/or specific learning disorders (SLD)**
  To support students with certified disabilities, the Study Program, upon notification from the University's Disability Office, provides faculty with a list of students requiring accommodations. Measures are then put in place to facilitate participation in courses and labs and to support

exam performance.
The Chair of the Study Program Board is the contact person for students with disabilities.

- **Working students**
  Attendance is not mandatory for lectures, exercises, or lab activities. Working students can stay updated with course content through the e-learning platform used by instructors to upload course materials.
  They are encouraged to contact instructors directly for guidance on how to best use the available resources.

Attendance Requirements
Attendance is not compulsory but strongly recommended.
Regular class participation is highly advised to ensure an in-depth understanding of the material and a balanced distribution of the study load over time.

ECTS/Hours Correspondence by Activity Type (lectures, exercises, labs, internships, seminars, etc.)
The ECTS credit system measures the student's workload—including individual study—needed to acquire knowledge and skills as specified in the course regulations (Art. 5 of Ministerial Decree 270/04).
Each learning activity (course, lab, internship, thesis, etc.) is assigned a specific number of whole ECTS credits.
Each ECTS corresponds to 25 hours of student work, including contact hours with instructors and independent study.

Credits are earned upon passing the relevant exam or another form of assessment outlined in the program's academic regulations.
ECTS per learning activity:

- **Lectures:** up to 8 hours/ECTS
- **Exercises:** up to 12 hours/ECTS
- **Teaching labs:** up to 16 hours/ECTS
- **Internship:** 25 hours/ECTS

Lectures: The main teaching activity where the student listens to the instructor and studies the content independently.
Exercises: Help clarify lecture content through applied examples. No new content is introduced. They are typically associated with a course and are not standalone. In *passive exercises*, the instructor leads; in *active exercises*, students work under supervision.
Laboratories: Hands-on sessions where students interact with tools, equipment, or software.
Project Laboratory: A supervised activity where students develop a project under the guidance of one or more instructors from different disciplines.
Internship: A project-based activity carried out either externally or within the department, covering all phases from problem analysis to implementation and evaluation. Supervised by an academic tutor and a company tutor for external internships.

Thesis: Involves writing a report, under the supervision of a tutor, describing a project or study activity, usually related to the internship.

Assessment of Learning Activities
Assessment is carried out via written or oral exams. Instructors may also adopt alternative methods such as projects, essays, or seminar presentations that may replace one or more parts of the final exam.

For students with disabilities or SLDs, assessment methods are based on the individualised learning plan issued by the University's Disability Office.
The course syllabi can include details on assessment methods and grading criteria.

Prerequisites and Course Restrictions
See the official study plan.
There are no prerequisites or course blocks required.

Art. 9 – Rules for Submitting Study Plans and Individual Study Plans

Students are required to submit their Study Plan during the first year, with the possibility to modify it in the following year, according to the annually established deadlines available on the Student Services webpage:
👉 https://www.uninsubria.it/servizi/presentazione-piano-di-studio

Students must fill out their study plan online by logging into their personal ESSE3 area, indicating:

- the elective courses within the specified disciplinary areas (as stated in the study plan);
- the "free choice" courses (TAF D), for which 12 ECTS credits are allocated.

The "free choice" educational activities may be selected from any courses offered by the University, with the exception of certain integrated courses in restricted-access healthcare degree programs.
The Study Program Council will evaluate the consistency of the chosen activities with the student's overall academic path.

Some recommended and compatible courses with the program are highlighted during the online study plan submission process to facilitate selection.
Please note that lessons of "free choice" courses offered by other degree programs at the University may overlap with the timetable of this study program and such overlaps may not be resolved.

Recognition of Professional Skills

The Study Program Council may recognise:

- professional knowledge and skills certified in accordance with current legislation;

- knowledge and skills acquired through post-secondary training activities co-designed and implemented by the university.

Requests for recognition will be assessed by the Study Program Council. Recognition may be granted if the activity aligns with the specific learning objectives of the degree program and the relevant educational activities, taking into account both content and the number of hours.
A maximum of 12 ECTS credits can be recognised.

Art. 10 – Opportunities Offered During the Study Program

The degree program promotes several initiatives to enhance and enrich the academic experience. In particular, students can participate in mobility and internationalisation programs:

- **International Mobility – Erasmus and Other Programs**
  👉 https://www.uninsubria.it/internazionale/mobilita-allestero/programma-erasmus
- **Tutoring Services**
  👉 https://www.uninsubria.it/servizi/tutti-i-servizi/tutorato
  The tutoring service includes various activities to guide, assist, advise, and inform students. In addition to the general university-level support service, the study program annually selects several tutors through a public call among third-year undergraduate and master's students. These include:
  - *Subject tutors*, who assist instructors during practice sessions
  - *Peer-to-peer tutors*, who are available to help students with first-year subjects
  - *Orientation tutors*, who participate in school outreach and orientation events
- **Student Collaborations (within the framework of the right to education)**
  Students can apply for part-time collaborations within the university:
  👉 https://www.uninsubria.it/servizi/tutti-i-servizi/collaborazioni-studentesche-200-ore
- **Internship – Internship Desk (Sportello Stage)**

  The internship is a key moment when students can apply and deepen their knowledge and skills with a high degree of autonomy.
  Through the internship, students enhance their independent judgment and communication skills, especially regarding the specific terminology of the discipline chosen for the internship. Self-learning and self-assessment abilities are also stimulated and improved.

  The internship provides valuable experience for both further academic pursuits and entry into the job market.
  The internship's educational goals are outlined in a specific individual training project, approved by the Internship Committee. They must align with the program's learning objectives and the expected career outcomes.

  The internship is preparatory to writing the thesis, which will be discussed during the final exam (see Art. 11).

Students must complete an internship with public or private companies or institutions, or within university research groups, under the supervision of a university tutor, for a duration of six months. Internship projects must demonstrate a strong degree of **innovation**, focusing on the introduction of new methodologies or novel approaches to problem-solving.

Through the Internship Desk, the Department of Theoretical and Applied Sciences (DiSTA) promotes curricular internships, which provide students with practical experiences, even outside the university, especially with qualified public or private organisations.

👉 For the activation process of internal and external internships, visit:
https://www.uninsubria.it/servizi/tutti-i-servizi/tirocini-curriculari-dista
Please note that the regional regulations apply to external internships (Regional Decree DGR 7763/2018).

👉 For the Master's Degree in Computer Science, see the detailed internship guidelines:
https://www.uninsubria.it/sites/default/files/Didattica/DiSTA/DISTA_Progettazione_tesi_INFOM_F008.pdf

👉 Students can contact the Internship Desk for more information:
https://www.uninsubria.it/ateneo/tutte-le-sedi/sportello-stage-dista

Art. 11 – Degree Awarding

The final examination consists of presenting and discussing a Master's thesis written in English. The thesis must be an original work developed by the student under the supervision of a faculty member (advisor). It must demonstrate a well-structured and comprehensive research effort, showcasing the student's ability to conduct research, process information, and synthesise findings.

The thesis may be based on work carried out within the University on a topic proposed by the advisor, or on a project developed at an external company or institution, subject to approval by the advisor. Although the Course Council has not set specific minimum requirements, the Internship Committee may assess the admissibility of individual requests to activate curricular internships.

The **29 ECTS credits** allocated for the final examination are distributed as follows:

- **28 ECTS** for Thesis Preparation
- **1 ECTS** for Final Dissertation
  Additionally, the study plan includes **1 ECTS** for Thesis Design within the framework of Training and Orientation Internships.

The **final degree mark**, expressed out of 110 with the possibility of **honours (cum laude)**, is calculated by summing the following components:

1. The **weighted average** of the marks obtained in individual course exams (weighted by credits), converted to a scale of 110, as defined by the University Student Regulations;
2. An **additional score from 0 to 7 points** based on the evaluation of the final examination;
3. An **extra score of up to 3 points** for students who have participated in an ERASMUS mobility program, determined using two performance indicators:
    - **N** = Number of ECTS credits recognised for exams listed in the Learning Agreement (including modifications) and completed at the host foreign institution.
    - **M** = Average grade (converted to Italian scale out of 30) of those recognised exams.

Additional points are awarded according to the following rules:

- 1 point if **N is between 20 and 29 ECTS (inclusive)**;
- 2 points if **N is 30 ECTS or more** and **M ≤ 25/30**;
- 3 points if **N is 30 ECTS or more** and **M > 25/30**.

The schedule of graduation sessions and registration procedures for the final exam is available at the following link:

🔗 Graduation Information

Upon graduation, students receive the **Diploma Supplement**, an official document in both Italian and English that accompanies the degree. It describes the nature, level, context, content, and status of the studies undertaken and completed. The Diploma Supplement aims to enhance international transparency of qualifications and ensure fair academic and professional recognition, supporting student mobility. It conforms to the **Europass** standard.

Further information and the document template are available here:

🔗 Diploma Supplement Guidelines (Ministry)

Art. 12 – Quality Assurance of the Study Program

Quality Assurance (QA) follows the procedures, methodologies, and timelines defined by the University's **Presidio della Qualità di Ateneo** (University Quality Assurance Board), in line with the directives of the **Ministry of University and Research** and the **National Agency for the Evaluation of the University and Research Systems (ANVUR)**.

The Course Council ensures the **teaching and organisational coordination** of the study program in accordance with the responsibilities and guidance of the Department Council and relevant regulations. Study programs at both bachelor's and master's levels within the same disciplinary area may fall under the same Course Council.

Each Council elects a **President**, who acts as the Program Director and is responsible for the educational offer, the self-assessment and review processes of the program. The Council generally

meets **monthly** to handle regular management tasks, review and approve subcommittee proposals, and issue recommendations to the Department Council. Responsibilities include annual teaching planning, student matters, internships, orientation activities, partnerships, lab and seminar activities, exam and graduation calendars, etc.

The President is supported by the **Course-level AiQua Committee** (Internal Quality Assurance Committee), which manages quality processes, supports self-assessment and review, and prepares key quality documents.

The AiQua Committee includes:

- The President of the study program
- One or more faculty members
- One or more student representatives
- A **Didactic Quality Manager (MDQ)**, who facilitates the QA system, provides administrative support, and communicates observations, critical issues, and suggestions for improving teaching and services.

The **Joint Teaching-Student Committee** at the Department level consists of one student and one professor for each study program in the department, representing various disciplines. Students are elected by their peers on the Course Council or, if none, by the Department Council. A professor serves as Chair and a student as Vice-Chair. An MDQ from the Department supports the meetings.

This Committee monitors the **Department's educational offering, teaching quality, and student services**. It defines evaluation indicators, provides opinions on the activation or discontinuation of courses and study programs, and suggests improvements to teaching performance and efficiency.

The committee meets periodically for effective monitoring.

Students elect their representatives to the Department Council, Study Program Council, and Joint Committee, and appoint representatives to AiQUA Committees. Names of elected representatives are available at:

🔗 DiSTA Representatives

Teaching Evaluation Questionnaires and Opinion Week

1. Students evaluate teaching via an **online questionnaire**, available for "attending" and "non-attending" students. It is available during the final third of the semester and accessible through the ESSE3 system when registering for exams. Anonymity is guaranteed.
   🔗 Student Opinions

As part of the **University QA initiative**, the Study Program joins the **Opinion Week**, where instructors invite students to complete the questionnaires. There is also a feedback session to share previous semester results and resulting actions.

2. At the end of the internship, students must fill out an **evaluation form** to provide feedback on the experience. This helps the University monitor and improve the internship program. Students must also submit a **completion report** to the Internship Office for academic credit.

The Study Program refers to AlmaLaurea survey data for graduate and alumni feedback, also available on the program's webpage under: **Student and Graduate Opinions**.

Art. 13 – Final and transitional standards

ANNEXES
Annexe 1 – Study Plan
Annexe 2 – Summary of Mandatory Course Objectives

Annexe 1 – Study plan

PLANNED TEACHING - COHORT 2025/2026

By planned teaching we mean the set of courses provided for the entire course of study, which must be taken by all students who enrol in the current academic year (Enrolment Cohort) to complete the training course and obtain the qualification.

I° YEAR						
Course TITLE	**CFU**	**S.S.D.**	**DISCIPLINARY FIELD / TAF**	**HOURS**	**semester**	**ASSESSMENT METHODS***
DATA SECURITY AND PRIVACY	9	INF/01	B / Computer Science	LEZ:56 ESE:24	Secondo	V
MACHINE LEARNING	9	ING-INF/05	B / Computer Science	LEZ:72	Primo	V
SOFTWARE ENGINEERING FUNDAMENTALS	9	ING-INF/05	B / Computer Science	LEZ:72	Primo	V
LOGIC FOR ARTIFICIAL INTELLIGENCE	9	MAT/01	C / Related & Complementary disciplines	LEZ:56 ESE:24	Secondo	V
ENGLISH FOR COMPUTER SCIENCE	6	L-LIN/12	F / Ulteriori conoscenze linguistiche	LEZ:48	Primo	V

ELECTIVE COURSES IN CHOICE BLOCKS

I° e II° YEAR						
The student must choose 12 credits in the first year and 12 credits in the second year among the courses activated in Disciplinary Area B/Computer Science Disciplines **The student must choose six credits in the first year and six credits in the second year among the courses activated in Disciplinary Area C/Related or supplementary educational activities**						
Please note: some courses may be activated in alternate years. The final framework of the courses activated in the years of competence will be made available at the opening of the online submission/modification of the study plans						
Course TITLE	**CFU**	**S.S.D.**	**DISCIPLINARY FIELD / TAF**	**HOURS**	**semester**	**ASSESSMENT METHODS***
CLOUD DATA MANAGEMENT	6	INF/01	B / Computer Science	LEZ:32, ESE:12, LAB:16	Second	V

DEEP LEARNING	6	INF/01	B / Computer Science	LEZ:48	Second	V
DATABASE TECHNOLOGIES FOR BIG DATA	6	INF/01	B / Computer Science	LEZ:48	Second	V
REQUIREMENTS ENGINEERING	6	ING-INF/05	B / Computer Science	LEZ:48	First	V
INNOVATIVE TELECOMMUNICATION SYSTEMS	6	ING-INF/05	B / Computer Science	LEZ:32, ESE:12, LAB:16	Second	V
SECURITY RISK MANAGEMENT	6	INF/01	B / Computer Science	LEZ:48	Second	V
DATA SCIENCE FOR BUSINESS	6	INF/01	B / Computer Science	LEZ:40 LAB:16	Second	V
SOFTWARE PROJECT MANAGEMENT	6	ING-INF/05	B / Computer Science	LEZ:48	First	V
ARTIFICIAL INTELLIGENCE FOR SIGNAL ANALYSIS	6	INF/01	B / Computer Science	LEZ:48	Second	V
PROCESS ALGEBRAS	6	INF/01	C/Related & Complementary disciplines	LEZ:48	First	V
MODELS FOR BIOLOGICAL SYSTEMS	6	INF/01	C / Related & Complementary disciplines	LEZ:48	First	V
WEB SERVICES AND ARTIFICIAL INTELLIGENCE INTERFACES	6	ING-INF/05	C/Related & Complementary disciplines	LEZ:48	Second	V
FOUNDATIONS OF BLOCKCHAINS	6	INF/01	C/Related & Complementary disciplines	LEZ:48	Second	V

OTHER COMPULSORY ACTIVITIES

II° YEAR							
Denominazione	**MODULE name**	**CFU**	**S.S.D.**	**DISCIPLINARY FIELD / TAF**	**HOURS**	**semester**	**ASSESSMENT METHODS** *
ELECTIVE COURSES		12	NN	D / Elective		ND	V
THESIS DESIGN		1	NN	F / Other Activities	TIR:25	Annuale	I
FINAL EXAM	*THESIS PREPARATION*	28	PROFIN_S	E / Final exam	PRF:725	Second	V
	FINAL DISSERTATION	1					

*G – GRADE V – EXAM I – PASS F – ATTENDANCE

***HOURS** and type of activity **LEZ**: lesson **ESE**: exercise **LAB**: laboratory **TIR**: internship **PRF**: final exam*

Annexe 2 – Summary of the objectives of compulsory courses

Course name	*Year*	*Learning objectives – summary taken from the syllabus*
DATA SECURITY AND PRIVACY	I	The course's primary goal is to illustrate the models, languages, and tools for the management of access control and privacy policies within a data management system. A part of the course will also be devoted to access control and privacy issues in innovative contexts (such as IoT and Big Data). More specifically, the main objectives of the course are the following: 1. Know the basic concepts and terminology related to cybersecurity and privacy. 2. Understand the main existing access control models and customise them according to the needs of specific application domains. 3. Know and be able to use the support provided by SQL for access control. 4. Have an in-depth look at the primary access control services provided by the Oracle DBMS. 5. Know the main laws and regulations that pertain to data privacy. 6. Understand the differences between online and offline privacy and know the main techniques to achieve both of them. 7. Be aware of the main research trends and challenges in the field of cybersecurity and privacy. Additionally, the expected course outcomes also include the ability to independently translate specific access control/privacy requirements with the languages/mechanisms seen in class, while also being able to choose the best solution for the considered domain when multiple options are possible. The knowledge provided by the course will facilitate individual deepening of student knowledge and development of new skills. For example, it should not be difficult for a student who has successfully followed the course, to independently learn the concepts underlying a new access control mechanism, or a new technique for privacy protection. This is also facilitated by the presentation of the main research trends in the area.
ENGLISH FOR COMPUTER SCIENCE	I	The course aims to improve students' knowledge and use of the conventions of academic English. It will cover some of the areas of scientific communication that students should master in order to successfully promote their research, including how to write cohesive and coherent sentences and paragraphs, how to paraphrase, how to read research papers and write abstracts. Students will get a chance to practice their writing and speaking skills, and improve their academic English vocabulary and grammar. On completion of the course, students should be able to 1. Communicate in a clear, concise and correct manner. 2. Extract required information from spoken or written technology-related material, using skills in research, note-taking and summarization 3. Describe information (data, processes and phenomena) in a formal, objective manner. 4. Exchange technology-related information using language that is appropriate to the medium. 5. Develop communication skills relevant to technology-related employment including professional expression.
MACHINE LEARNING	I	The course provides broad coverage of intelligent systems solving pattern recognition problems. Theoretical concepts in intelligent systems and techniques relevant to real-life applications will be illustrated. The student will be able to: 1. Know the main objectives and areas of Artificial Intelligence, Machine Learning, and Pattern Recognition, with the ability to identify the potentialities of intelligent techniques and the relationships with other disciplines 2. Know the basic concepts of automated learning based on machine learning approaches and the conditions for their applicability 3. Know the most relevant feature extraction and selection techniques 4. Know statistical techniques and their limitations and strengths, with the ability to appropriately select the proper technique in specific contexts 5. Know basic principles of neural computing and their characteristics 6. Know Flat and Hierarchical Clustering with the ability to configure and apply these methods in specific contexts 7. Know performance metrics for learners 8. Know basic concepts of the following application domains: Image Classification, Text Categorization, Biomedical Data Analysis 9. Know how to program in a language for statistical computing and machine learning applications like R It is also expected that students develop communicative skills through open discussion and autonomous assessment in the choice of the proper technique to solve problems of recognition and /or automatic classification of multidimensional data in several domains. Students will acquire also knowledge of the relevant Machine learning and Pattern Recognition terminology.

LOGIC FOR ARTIFICIAL INTELLIGENCE	I	The course aims to provide basic knowledge of how logical systems can be used to deal with computational issues, in particular in relation with artificial intelligence and knowledge representation. Such knowledge is aimed at forming and increasing the abstraction of information through symbolic representation and thus the ability to understand an abstract and symbolic scientific language. At the end of the course the student will be able to: 1. Know the basic logical systems, propositional and predicative logic, temporal logic and modal logic 2. Know and apply the basic SAT solvers, binary decision diagrams and their algorithms 3. Know how to write programs in logic programming (Prolog) for representing knowledge 4. Know how to deal with pure declarative programming (Answer Set Programming) for planning problems and for finding solutions to puzzles and games 5. Understand tools and properties of model checking, know and apply the NuSMV model checker 6. Know how to deal with uncertainty and vagueness in reasoning, using probabilistic and fuzzy logic Expected learning outcomes include the ability to identify any errors in computational argument, and to have the ability to use a formal language for the description of computational problems.
SOFTWARE ENGINEERING FUNDAMENTALS	I	The main goal is to provide the fundamentals of Software Engineering. More specifically the main topics presented are: Software life cycles, System requirements specification, Verification and validation along with some concepts on how to manage software development. Moreover, the main computational and architectural paradigms of sequential, concurrent and distributed systems will be presented. The expected outcomes involve both the theoretical knowledge of the above topics and the ability to identify the right methods and techniques to face software development, starting form the definition of the life cycle down to cost estimation. More specifically, the expected outcomes are: 1. Knowledge and comprehension skills 1.1. Knowledge of the characteristics of the software development process and of its products (requirements specification, models, test cases, development plans etc); 1.2. Knowledge of the issues and methods of requirements analysis; 1.3. Knowledge of the issues of software verification and validation and of the strategies to tackle such issues; 1.4. Knowledge of the architectural and computational models of software systems. 2. Application of the knowledge and comprehension skills 2.1. Be able to apply different techniques and requirements specification languages (DFD, Petri Nets, Z, TRIO); 2.2. Be able to apply costs estimation techniques (By analogy, COCOMO, Function Point); 2.3. Be able to apply different testing approaches and to evaluate the obtained results; 2.4. Be able to apply the different architectural and computational paradigms when defining the system characteristics. 3. Autonomous thinking 3.1. Be able to evaluate the best fitting approach, in term of development process, based on requirements and constraints; 3.2. Be able to choose the specification techniques and languages depending on the characteristics of the system; 3.3. Be able to choose the validation and verification techniques with respect to the characteristics of the system, the related cost and the degree of confidence that has to be met; 3.4. Be able to choose the paradigms and the computational models depending on the characteristics of the system. 4. Ability to learn 4.1. Thanks to the skills, developed during the course, to relate the technique, methods and tools to both software main features and software development, the student is able to learn new techniques, methods and tools and to refine its ability to apply what he/she learned in an autonomous way. 5. Communication skills 5.1. Be able to use the formalisms used to analyse, specify and design software systems.