UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2025/26
BACHELOR
Computer Systems and Networks Security - online (Classe L-31) enrolled from 2021/2022 until 2024/25 academic year

HEADING

Degree classification - Denomination and code:	L-31 Computer science
Degree title:	Dottore
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	2nd , 3rd
Access procedures:	Cap on student, student selection based on entrance test
Course code:	F1A

PERSONS/ROLES

Head of Study Programme
Prof. ssa Sabrina Gaito

Degree Course Coordinator
Prof. Marco Anisetti

Tutors - Faculty
TUTOR PER L'ORIENTAMENTO:
Paolo Ceravolo
Angelo Genovese
Elvinia Riccobene
Nello Scarabottolo

Degree Course website
https://ssrionline.cdl.unimi.it/it

Career Guidance Board

Via Celoria,18 - Milano   https://di.unimi.it/it/dipartimento/organizzazione/commissioni   Email: orientamento.uscita@di.unimi.it

Course management

Via Celoria,18 - Milano   Sportello su appuntamento (ufficio.didattica@di.unimi.it)   https://di.unimi.it/it/dipartimento/segreterie-e-servizi/ufficio-la-didattica   https://informastudenti.unimi.it/saw/ess?AUTH=SAML

Erasmus and International Student Board

Via Celoria,18 - Milano   https://di.unimi.it/it/dipartimento/organizzazione/commissioni   Email: erasmus@di.unimi.it

Internship and Bachelor's Degree Thesis Board

Via Celoria,18 - Milano   https://di.unimi.it/it/dipartimento/organizzazione/commissioni   Email: commTesiL3@di.unimi.it

Process tutor

Email: sabrina.papini@unimi.it

Programme Transfer Board

Via Celoria,18 - Milano   https://di.unimi.it/it/dipartimento/organizzazione/commissioni   Email: trasferimenti@di.unimi.it

Student Orientation Board

Via Celoria,18 - Milano   https://di.unimi.it/it/dipartimento/organizzazione/commissioni   Email: orientamento@di.unimi.it

Student registrar

Via Celoria,18 - Milano   Phone 0250325032   https://www.unimi.it/it/node/360/   https://www.unimi.it/it/node/359/

Student representatives

Email: rappresentanti.studenti@di.unimi.it

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The degree program aims to provide a broad and in-depth technological and methodological preparation in the IT area, with specific attention to topics in the cybersecurity and information privacy areas as well as a solid and methodological knowledge of the main areas of mathematics, physics, and the like, thus offering adequate preparation for assimilating, understanding and evaluating the impact of scientific and technological progresses within the Information technology area with particular focus on the cybersecurity and privacy fields. The graduate in Systems and Network Security will be able to face all the problems deriving from the creation of secure services both at infrastructural and application level. The course also aims to provide an in-depth operational knowledge that allows graduates to be engaged by professional subjects, either private or public, interested in the adoption of methodological and technological tools for improving the security of their IT services and infrastructures.

Expected learning outcomes

Knowledge and Understanding

Graduates in Systems and Network Security will have knowledge and methodological/operational skills in the following fields of IT security and data protection: cryptography, network and system security, information privacy, data protection, computer incident management. More precisely:

1. Knowledge of techniques for designing complex secure IT systems.
2. Knowledge of the methods and tools for the analysis of information systems, with particular reference to their security aspects.
3. Knowledge of the various aspects related to information privacy: legal, organizational and technological.
4. Knowledge of methods and techniques for the realization of safe services architectures.
5. Knowledge and understanding of organizational cybersecurity issues and their solutions.

Ability to apply knowledge and understanding

Graduates of the course will be able to apply the knowledge and skills acquired to analyse, to draw, to create and to evaluate secure and protected IT systems operating in various application areas: commercial, industrial, public administration, insurance, banking, hospital, environmental, energy and research. More precisely these are the expected learning outcomes:

1. Knowledge of a wide spectrum of application areas and cybersecurity solutions adopted in them.
2. Ability to analyze a specific problem whose solution requires the use of IT tools and to choose the most appropriate methods for its solution.
3. Ability to collect, evaluate and analyze empirical evidence relating to the behavior of an IT system.

Making judgments

Graduates of the course will acquire the ability to make independent and aware judgments about the design choices of a given cybersecurity architecture. They will also assimilate the principles of professional ethics and code of conduct which will guide their professional life.

Expected learning outcomes

1. Ability to reason critically and to question design and implementation choices.
2. Ability to develop autonomous and independent reasoning.
3. Awareness of the existence of different alternative technological approaches for the design and analysis of systems.
4. Ability to critically evaluate the relevance and merits of alternative projects.

Communication skills

Graduates of the course will be able to argue their ideas and communicate the results of their analysis and evaluations in a clear and effective way: in natural language, using the English language, and making use of the most up-to-date IT tools.

Expected learning outcomes

1. Written communication skills, based on the use of appropriate terminology and technical languages.
2. Ability to write a technical report in a clear, consistent and concise way.
3. Ability to formulate and express orally, even in public contexts, technical arguments.

Learning skills

The degree program aims to lead its students to a complete understanding of technical and methodological problems in the System and Network Security area. For this reason the course favors the development of learning skills by their students, as well as the acquisition of methodological skills and competences that allow them to independently undertake preliminary research activities as well as in-depth study. Students are also encouraged to consider a future enrollment in a master's degree

program.

Expected learning outcomes

1. Ability to organize one's ideas critically and systematically.

2. Ability to identify, select and collect information through the appropriate use of the relevant sources.

3. Ability to use libraries, databases, digital and paper archives to access relevant information.

4. Ability to organize and implement an independent study plan.

5. Ability to reflect on one's own learning experience and to adapt it in response to suggestions and stimuli by teachers or colleagues.

6. Ability to recognize the need for further studies and to appreciate the role of innovative learning modalities.

Professional profile and employment opportunities

Cybersecurity Consultants

These professional figures operate in the business consultancy sector as a support to companies in the analysis and resolution of IT security issues related to information system, data processing, system and network management, and applications development.

They are professionals with specific skills in the field of technologies and methods for IT security that can understand the business and organizational dynamics in which they operate. They can work in structured projects and heterogeneous business contexts by offering highly qualified knowledge for security-related problem-solving, technology selection, and innovation.

They carry out highly specialized professional activities in the field of business consultancy for both private and public companies which lack adequate computer security skills for correct and effective management of information systems as well as data processing systems.

IT technicians specialized in systems, networks and mobile devices security

Cyber security experts that inserted in the staff of a company bring the required skills for the secure management of databases, systems and networks equipment, PCs and mobile devices. The functions covered include: the management of access control policies and systems, the secure configuration and management of specific IT systems, the monitoring of a company IT systems and the management of technologies for disaster recovery and business continuity.

These professional figures are specialists in information technology and specific technologies and methods of cyber security. They can operate as IT experts but with knowledge of the main critical issues relating to IT security. They are also able to provide technological solutions aimed at guaranteeing an adequate level of protection for business resources and operations.

The secure management of systems, networks and mobile devices is a corporate requirement spread horizontally on the large part of the industrial, public administration and services sectors. All large companies as well as small and medium-sized enterprises have an internal staff to manage their information systems, including proprietary data and managerial and commercial transactions. Security and business continuity requirements are at the basis of the well functioning of such systems.

Specialized technicians in the analysis and development of secure software applications

The professional profiles included in this category belong to the professional profiles of software analysts and designers with particular skills regarding the use of methodologies aimed at identifying security vulnerabilities and preventing security problems in application. They are also experts in cryptographic techniques (algorithms and protocols) to be used for the protection of data.

These professionals integrate traditional software development and programming skills with specific knowledge of the main security problems that software can present. In the development cycle of software, these professionals are therefore able to integrate the main methodologies for software security from the design and planning phases, towards the development and testing. They are also skilled in the verification of software vulnerabilities and the identification of suitable countermeasures. Developing software according to security criteria and verifying the security of third party software are necessities now common to most software houses where this job profile is particularly required.

Specialized technicians in the analysis and development of secure web applications, multimedia, interactive and mobile applications

The professional profiles included in this category are web applications analysts and designers with specific skills regarding the security of applications characterized by strong interactivity and the use of mobile devices. These professionals integrate the ability to develop web applications with knowledge of the security problems and contribute to protect company assets from what is today the main channel of malicious code propagation, unauthorized accesses and computer crimes.

These professional figures know the main methodologies used in the creation of interactive web applications based on mobile devices, taking care of both their security design and verifying their degree of security through testing and monitoring tools and techniques.

Expertise in cryptographic techniques is used to secure network communications and to protect data managed through web applications. They are also very oriented towards technological innovation, considering the rapid evolutionary dynamics that characterize web technologies.

The increasing spread of e-commerce, web transactions between companies and the development of mobile apps for providing customer services makes these professional figures more and more relevant for all companies, both private and public and of any size and industrial sector, which have adopted web services as one of the main communication channels for their commercial presence or for the provision of services.

Technicians specialized in information and communication technologies
The professional profiles included in this category are experts in the management, deployment and use of information and communication technologies in the various operational contexts. These professionals integrate the ability to develop and maintain computer applications, even complex, with the knowledge of various application contexts (industrial automation, information systems, digital communication, decision support, etc.).
These professionals possess a broad spectrum of knowledge and skills in the various fields of information technology and telecommunications. They are familiar with the scientific method of investigation, have good modeling skills, and can understand and use mathematical tools to support their computing skills. They can work in a team, operate independently, and integrate rapidly in the working environment.
Graduates can operate in the many ICT application fields for the design, deployment and management of IT systems, and for the study of new architecture and/or applications

Initial knowledge required

Qualifications and knowledge required for admission
In order to be admitted to the online Bachelor's degree programme in Computer systems and networks security, you must have e high-school diploma or equivalent foreign qualification pursuant to Ministerial Decree no. 270 of 22 October 2004.

Admission assessment
Admission is capped in order to meet high-quality teaching standards relative to the available resources. Therefore, you will have to take a TOLC - CISIA Online Test before enrolling. There are 150 places available for the first year of the programme.
You may sit for the TOLC test at the University of Milan or any other member university of CISIA (Consortium of Inter-University Integrated Access Systems). Register to the TOLC test on the CISIA website (https://www.cisiaonline.it/).
The test providing access to the degree programme is TOLC-S, consisting of the following sections: Basic mathematics (20 questions - 50 minutes), Reasoning and Problems (10 questions - 20 minutes), Reading comprehension (10 questions - 20 minutes), Basic sciences (chemistry, physics and geology - 10 questions - 20 minutes).
Each question has 5 answer options, of which only one is correct.
Score: +1 for a correct answer, -0.25 for a wrong answer, 0 for a no answer.
Candidates who take the TOLC-S and apply for admission to the online degree programme in Computer Systems and Networks Security will be included in a merit ranking based on the test score. The score will be weighted, for each section, according to the criteria set out in the call for applications. The winners may enrol within the deadlines.
The selection is divided into several time windows beginning in February and ending in early September.
Students who have not achieved at least 10 points in the Basics mathematics module will have to fulfil additional learning requirements (OFA).

The TOLC test includes an additional English section, consisting of 30 questions to be answered in 15 minutes. This section does not count toward the overall test score.

Detailed information, registration procedures, dates, deadlines and other information are published in the call for applications and at the following addresses:
https://www.unimi.it/en/study/enrolment
https://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/enrolment-first-degree-programme

Remedial activities and tests.
Students with additional learning requirements will have to carry out remedial activities organised by the University in the period October-December, and then take a test to prove they have filled their gaps. Otherwise, they may not take any second-year exams before passing the Continuum mathematics exam.
For information: https://ssrionline.cdl.unimi.it/it/studiare/le-matricole

Transfers and second degrees
Students who are already enrolled in a degree programme of the University of Milan or another University, as well as graduates, will be waived from the test requirement only if they meet the following requirements, based on academic records assessments:
- if, following academic records assessments, the student is awarded at least 30 credits of which 12 for Continuum Mathematics, he/she will be admitted to Year II with a waiver from the test requirement and with no additional learning requirements (OFA);
- if the student is awarded less than 30 credits, he/she student must register for the test.
To this end, they will have to submit a specific request for prior assessment of their academic records using the online service as shown in the call for applications.
These candidates must provide a full transcript of records (listing exams, subject areas, credits, grades) and attach the course syllabi. For more details, please refer to the call for applications.
The application for academic records assessment must be submitted within the deadline stated in the call for applications.
The assessment outcome will be notified by email by the date stated in the call.
Students admitted to years subsequent to the first must enrol in compliance with the deadlines and procedures specified in

the call for applications.

Students admitted to the first year will be required to take the test and register for the call.

Internship criteria

The internship is mandatory, is linked to the final paper and can be carried out on or off campus (at a company or another organization).

The internship experience normally consists of participating in a significant project, within which the student will independently carry out the activities assigned to him/her in accordance with the number of credits awarded for the internship under that programme (see "Manifesto degli studi").

The final paper must document the design and implementation aspects of the activity carried out, the professional or scientific skills learned, as well as its connections with the state of the art in the IT sector.

The internship must last at least 14 weeks (of which 2 for writing the paper).

Upon completion of the internship, the student will earn 15 CFU, subject to the positive opinion of the Academic Board.

For the student to start the internship, he/she must comply with all the provisions of the relevant regulations.

Find out how to apply for an internship, read internship regulations and more at https://ssrionline.cdl.unimi.it/it/studiare/stage-e-tirocini

Degree programme final exams

The final exam consists in the discussion of a paper on the internship written by the student.

The final exam involves the discussion of an internship activity that can be certified.

In order to be admitted to the final exam, you must have earned 177 credits, including the final internship. The calendar of graduation sessions, applications deadlines and the required documentation are posted to the website https://ssrionline.cdl.unimi.it/it

Campus

Exams are held on the campus at via Celoria 18, Milan.

Notes

In order to obtain their degree, students must be proficient in English at a B1 level under the Common European Framework of Reference for Languages (CEFR). This proficiency level may be certified as follows:

- By submitting a language certificate attesting B1 or higher level in English and issued no more than three years before the date of submission. You will find the list of language certificates recognized by the University at: https://www.unimi.it/en/node/39322). The certificate must be uploaded during the enrolment procedure, or subsequently to the portal http://studente.unimi.it/uploadCertificazioniLingue;

- By taking a placement test offered by the University Language Centre (SLAM) between October and December of the first year. Students who fail the test will be required to take a SLAM course.

The placement test is mandatory for all those who do not hold a valid certificate attesting to B1 or higher level.

Those who have not taken the placement test by the end of December or fail the end-of-course exam six times must obtain the necessary certification privately before graduating.

EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.

The agreements entered into by the University with over 300 universities from the 27 EU member countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

The education program can be enriched by educational activities abroad both to deepen some topics and as socialization experience in international environments. Within the Erasmus+ program study periods can be taken in over 50 universities in Belgium, Czech Republic, Finland, France, Germany, Greece, Hungary, Lithuania, Norway, Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Switzerland, Turkey. Courses will be recognized in the personalized study plan. These periods abroad are typically 5-month long and include courses for about 30 CFU, in the area of information and communication technology and related applications. Recognition of these educational activities will be based on the Learning Agreement, to be defined in advance by the student and the Erasmus coordinator at the Computer Science Department before starting the period abroad: course in the learning agreement with passed exams will replace the educational activities of the study plan ("manifesto"), either by covering the same topics or complementing the acquired basic competences. The Erasmus Committee at the Computer Science Department will perform the recognition of CFU obtained abroad and the definition of the personalized study plan. Similarly, stages to prepare the final dissertation are allowed in the same foreign universities. Recognition will be performed by the Department Erasmus Committee.

Erasmus: the coordinator for the Department of Informatics is Prof. Fabio Scotti

International Programs: the coordinator for the Department of Informatics is Prof. Davide Rocchesso.

More information are available at the following link: https://di.unimi.it/it/rapporti-internazionali/mobilita-internazionale/opportunita-internazionali

How to participate in Erasmus mobility programs

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.

Ad hoc commissions will evaluate:

• Academic career

• the candidate's proposed study programme abroad

• his/her foreign language proficiency

• the reasons behind his/her application

Call for applications and informative meetings

The public selection for Erasmus+ mobility for study generally begins around February each year with the publication of a call for applications specifying destinations and requirements. Regarding the Erasmus+ Mobility for Traineeship, the University of Milan usually publishes two calls a year enabling students to choose a destination defined by an inter-institutional agreement or to find a traineeship position on their own.

The University organizes informative meetings to illustrate mobility opportunities and rules for participation.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which may be supplemented by the University funding for disadvantaged students.

Language courses

Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University Language Centre (SLAM).

https://www.unimi.it/en/node/8/

Learn more at https://www.unimi.it/en/node/274/

For assistance, please contact:

International Mobility Office

Via Santa Sofia 9 (second floor)

Tel. 02 503 13501-12589-13495-13502

Contacts: InformaStudenti; mobility.out@unimi.it

Student Desk booking through InformaStudenti

1st COURSE YEAR (disactivated from academic year 2025/26) Core/compulsory courses/activities common

Learning activity	Ects	Sector
COMPUTER ARCHITECTURE	6	INF/01
COMPUTER PROGRAMMING	12	INF/01
CONTINUUM MATHEMATICS	12	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
CYBERCRIME LEGAL FRAMEWORK	6	IUS/17
Cybersecurity management	6	INF/01
DISCRETE MATHEMATICS	6	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
English assessment B1 (3 ECTS)	3	ND
WEB AND MOBILE PROGRAMMING	6	INF/01
	Total compulsory credits	57	

2nd COURSE YEAR Core/compulsory courses/activities common

Learning activity	Ects	Sector
ALGORITHMS AND DATA STRUCTURES	12	INF/01
COMPUTER NETWORKS	12	INF/01
CRYPTOGRAPHY	6	INF/01
DATABASES	12	INF/01
OPERATING SYSTEMS I	6	INF/01
OPERATING SYSTEMS II	6	ING-INF/05
STATISTICS AND DATA ANALYSIS	6	INF/01
	Total compulsory credits	60	

3rd COURSE YEAR Core/compulsory courses/activities common

Learning activity	Ects	Sector
BIOMETRIC SYSTEMS	6	INF/01
COMPUTER FORENSICS	6	IUS/20
SECURE SOFTWARE DESIGN	6	INF/01
SYSTEM AND NETWORK SECURITY	6	INF/01

WEB E MOBILE SYSTEM SECURITY		6	INF/01
	Total compulsory credits	30	

Further elective courses

Free choice courses.
Students will have to achieve 12 free cfu among the courses of the previous tables, among the following courses activated by the Department, or among all the courses activated by the university.

Students can request the recognition of credits for training activities at external institutions, presenting a certification. Each certification can give rise to a maximum of 3 credits, and up to 2 certifications can be recognized. The students who intend to request the recognition of the certifications must complete the "application" form available on the page https://www.unimi.it/en/study/student-services/welcome-desk-infostudenti/general-forms and send ver to the secretary of his / her degree together with a copy of the certifications achieved.
The evaluation will be carried out by a special commission based on the following parameters:
- Validity: the certification must have been obtained for a maximum of 5 years.
- Specificity: the object of the certification must be those referable to those required by the degree course in which the student is regularly enrolled.
- Specialization: the certification must concern specialized and / or professional skills.
- Level: the certification must attest to skills of a medium or advanced level. Basic and entry level certifications are excluded.

End of course requirements

ECONOMICAL, ETHICAL, SOCIAL, AND LEGAL ASPECTS OF IT		3	NA
FINAL EXAM		3	NA
FINAL STAGE		15	NA
	Total compulsory credits	21	

COURSE PROGRESSION REQUIREMENTS

The compulsory prerequisites between the courses are as follows:

Learning activity	**Prescribed foundation courses**	**O/S**
DATABASES	COMPUTER PROGRAMMING	Core/compulsory
OPERATING SYSTEMS I	COMPUTER PROGRAMMING	Core/compulsory
STATISTICS AND DATA ANALYSIS	CONTINUUM MATHEMATICS	Core/compulsory
ALGORITHMS AND DATA STRUCTURES	COMPUTER PROGRAMMING	Core/compulsory