



**UNIVERSITA' DEGLI STUDI DI MILANO**  
**PROGRAMME DESCRIPTION - ACADEMIC YEAR 2024/25**  
**BACHELOR**  
**Computer Science for New Media Communications (Classe L-31)**  
**Enrolled from 2018/2019 academic year**

### HEADING

<b>Degree classification - Denomination and code:</b>	L-31 Computer science
<b>Degree title:</b>	Dottore
<b>Length of course:</b>	3 years
<b>Total number of credits required to complete programme:</b>	180
<b>Years of course currently available:</b>	1st , 2nd , 3rd
<b>Access procedures:</b>	Cap on student, student selection based on entrance test
<b>Course code:</b>	F9X

### PERSONS/ROLES

#### Head of Study Programme

Prof. ssa Sabrina Gaito

#### Degree Course Coordinator

Prof. Sergio Mascetti

#### Tutors - Faculty

TUTOR PER L'ORIENTAMENTO:

Giuliano Grossi

Sergio Mascetti

Alessandro Rizzi

Roberto Sassi

Matteo Zignani

#### Degree Course website

<https://icd.cdl.unimi.it/>

#### Career Guidance Board

via Celoria 18, Milano <https://di.unimi.it/it/dipartimento/organizzazione/commissioni> Email: [orientamento.uscita@di.unimi.it](mailto:orientamento.uscita@di.unimi.it)

#### Course management

via Celoria 18, Milano Phone 0250316250/252 Sportello in presenza: mercoledì dalle 14.00 alle 16.00 / Sportello telefonico: giovedì dalle 9.30 alle 12.30 <https://di.unimi.it/it/dipartimento/segreteria-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](mailto:erasmus@di.unimi.it)

#### international.students@unimi.it

via Celoria 18, Milano Phone 0250325032 <https://www.unimi.it/it/node/360/> <https://www.unimi.it/it/node/359/>

#### Internship and Bachelor's Degree Thesis Board

via Celoria 18, Milano <https://di.unimi.it/it/dipartimento/organizzazione/commissioni> Email: [commTesiL3@di.unimi.it](mailto:commTesiL3@di.unimi.it)

#### Programme Transfer Board

via Celoria 18, Milano <https://di.unimi.it/it/dipartimento/organizzazione/commissioni> Email: [trasferimenti@di.unimi.it](mailto:trasferimenti@di.unimi.it)

#### Student Orientation Board

via Celoria 18, Milano <https://di.unimi.it/it/dipartimento/organizzazione/commissioni> Email: [orientamento@di.unimi.it](mailto:orientamento@di.unimi.it)

#### Student representatives

Email: [rappresentanti.studenti@di.unimi.it](mailto:rappresentanti.studenti@di.unimi.it)

## **CHARACTERISTICS OF DEGREE PROGRAMME**

### **General and specific learning objectives**

The objectives of the degree programme in Computer Science for New Media Communication are, on the one hand, to provide a solid basic and methodological knowledge in the areas of computer and mathematical sciences and on the other to provide a good mastery of methodologies and technologies of communication and information and their use in the creation, integration and maintenance of high-tech environments for the dissemination of professional, scientific, cultural and entertainment contents. In addition, the programme offers adequate preparation for the different application areas of the discipline (web, cinema, photography, publishing, television, new media). The degree programme is structured with a common trunk, which then branches in two curricula ("Y" shape), aimed at creating professionals with different skills: one on the web and mobile computing, the other on multimedia. The two paths share a broad common basis that preserves the uniqueness of the programme, allowing crossing between the paths and ensuring the homogeneity and cultural coherence of the graduates.

### **Expected learning outcomes**

The degree programme offers adequate preparation to operate in the various application fields of the discipline (Web, mobile, publishing, radio, television, new media) and to assimilate, understand and evaluate the impact of constant scientific and technological progress in the scientific field of reference. The degree programme is structured in order to allow both immediate employability after graduation and the continuation of studies for the achievement of a master level degree. The degree programme provides solid operational and application skills. Particular focus is given to the ability to analyse, design and implement human-human and human-machine communication systems, based on information and communication technologies, in relation to the main reference areas: private companies, public administration and private sector. The degree programme also provides solid cultural and methodological basis aimed at continuing the studies, as well as the preparation and tools necessary to assimilate scientific and technological progress.

#### **Knowledge and understanding**

Acquisition of basic knowledge, related to mathematics, statistics, basic computer science, procedural and object programming languages, computer architectures, operating systems, databases and computer networks. Knowledge of multimedia computing, related to human-machine interaction, web and social media programming, cloud computing, distributed process management, signal processing and multimedia computing.

#### **Applying knowledge and understanding**

Acquisition of application skills in the field of information technology and its use for the realization of cultural mediation, entertainment and communication tools.

Scientific method: learning and using the scientific method through both lectures and laboratory sessions.

Modelling: the ability to use advanced tools in modeling systems at various scales, from "large" systems to applications that also require knowledge of hardware aspects and signal transmission problems in the implementation of multimedia tools, networks and mobile programming.

Operational skills: the ability to program a computer with different programming languages with particular reference to the ability to analyze, synthesize and implement technology-based human-to-human, human-to-machine communication systems based on computer science and communication technologies.

Use of modern technologies: use of programming environments and tools, the ability to use tools for capturing, compressing, encoding and transmitting distributed and multimedia information, as well as software systems for storage and fruition of digital content.

Ability to carry out teamwork: developed in laboratory courses and during the work for the preparation of the final thesis.

#### **Making judgments**

Graduates of the programme will acquire the ability to make independent and aware judgments about the decisions and design choices of the companies, organizations and institutions in which they will operate. They will also assimilate the principles of professional ethics that guide interpersonal relations in the professional contexts where they will operate after graduation, with particular attention to the economic and legal issues of intellectual property.

#### **Communication skills**

Acquisition of appropriate communication skills and the use of related tools with reference to: communication in Italian and foreign (English) language; skills in the practice of information technology for the acquisition, processing, generation, organization, storage and use of distributed and multimedia information. Graduates of the programme should be able to support their choices and communicate the results of their analyses and assessments clearly and effectively, using the language (English), which is most common in the international working contexts of reference, and using, with full technical mastery, the most up-to-date computer tools, as well as the most advanced tools (mathematical-statistical, economic-legal, for multimedia and distributed communication) for the analysis and representation of data and knowledge in social media, mobile and multimedia contexts.

#### **Learning skills**

The degree programme aims to lead its students, albeit gradually, to the frontier of the most advanced IT solutions in the multimedia, mobile and Internet sectors. For this reason, the programme has as a priority to promote the development of further learning skills by its students, as well as the acquisition of methodological and theoretical skills that allow its

graduates to pursue autonomously self-learning and design activities according to international standards, also in order to continue their studies with master's degree programmes in computer science and other related fields.

### **Professional profile and employment opportunities**

The working environments in which the graduate in Computer Science for Digital Communication can be inserted are: industry and services for cultural productions (Web, publishing, radio, cinema, television, new media), services for business communication, services for political-social communication, advertising companies, public and private companies.

In these fields, the graduate in Computer Science for Digital Communication will be able to deal with problems connected to the following activities:

- Management of the production and distribution chain of multimedia digital content
- digital and multi-channel publishing
- mobile and distributed applications
- cloud computing
- communication support based on multimedia digital technology
- planning and evaluation of communication via the Web
- acquisition, compression, coding and transmission of multimedia information
- integration of software systems and homogenization of distributed sources, Web and multimedia
- experts in graphics and digital photography
- technical experts of audiovisual productions
- development and testing of interfaces and intelligent user interfaces
- programming of basic and dedicated IT systems

#### Professional profiles

Technician in information technology for communication via networks and mobile devices.

#### Function in a working context:

The course trains experts capable of carrying out professional and/or research activities with functions of high responsibility theoretical-practical planning in the fields of communication mediated by the machine and its connection on the network; professionals with high theoretical and applied skills for the design and development of distributed and innovative IT systems such as mobile telephony, mobile and embedded devices, web applications and services such as digital marketing, e-government, e-learning, cloud computing, design and management of online social interaction environments.

#### Skills associated with the function:

The graduates are professionals capable of designing distributed systems, advanced applications for the web to support humanistic and social skills, and to analyze data deriving from distributed applications and their social and economic implications.

#### Employment opportunities:

Highly specialized technical professions related to the web, distributed systems and networks in general, for the development of professional computing applications, for the entertainment and for the social interactions. These figures can find work in the public administration, industry, the tertiary sector and various types of research bodies.

#### Technician of methodologies of communication and interaction through multimedia applications

#### Function in a working context:

The professions included in this category operate, at a design, research, technical and creative level, in the various fields of the communication and interaction fields, using multimedia information (images, audio, video, data). Such professions can operate in the radio-television, cinematographic, photographic, web, visual communication and advertising, art, music and entertainment events, video games, interface development.

#### Skills associated with the function:

The graduates are professional figures capable of understanding the technological aspects of new media and of managing their contents in appropriate manner; also they can be managers and innovators in the area of communication through the use of multimedia information. In fact, the effective planning and management of new digital media - web, television, cinema, photography, digital publishing, multimedia productions, etc. - requires multidisciplinary skills from heterogeneous cultural areas with a common base in the IT aspects to support these disciplines.

#### Employment opportunities:

The graduates carry out highly specialized professional activities in the field of communication on new media, such as the web, radio, television and digital cinema, post-production, photography, audiovisual and advertising communication, and computer graphics technologies, augmented and virtual reality, advanced and 3D visualization, computer-mediated communication tools, development of interfaces and natural interaction processes with machines.

### **Initial knowledge required**

Qualifications and knowledge required for admission

In order to be admitted to the Bachelor's degree programme in Computer science for new media communications, you must have a 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.

Students who take the TOLC-S test and apply for admission to the programme 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 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://icd.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.

#### **Compulsory attendance**

Attendance is strongly recommended for both courses and laboratories.

#### **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 16 weeks (of which 2 for writing the paper).

Upon completion of the internship, the student will earn 18 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://icd.cdl.unimi.it/it/studiare/stage-e-tirocini>

### **Degree programme final exams**

After earning the required academic credits, in compliance with these regulations, the student may sit the final exam and obtain their degree. Please refer to the University's Academic Regulations, for any other matters not covered herein. In accordance with the general criteria laid down by said regulations, the final exam may award students the remaining credits, and it will consist of a discussion of the final paper written by the student. This paper must be related to a theoretical or experimental activity carried out independently by the student in research groups or companies. The paper must document the design and implementation aspects of the activity carried out as well as its links with the state of the art in the IT sector.

### **Campus**

IT course venues: via Celoria 18 - Milan.

Other course venues: Teaching sector, via Celoria 20; Teaching sector, via Golgi 19; Teaching sector, via Venezian 15.

### **Laboratories**

Computer laboratory (Silab) at the Department of Computer Science, 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](mailto:mobility.out@unimi.it)

Student Desk booking through InformaStudenti

<b>1st COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
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
DIGITAL MARKETING	9	SECS-P/08
English assessment B1 (3 ECTS)	3	ND
HUMAN-COMPUTER INTERACTION	6	INF/01
INFORMATION TECHNOLOGY LAW	6	IUS/20
MATHEMATICAL METHODS FOR DIGITAL COMMUNICATION	6	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
Total compulsory credits		60
<b>2nd COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
ALGORITHMS AND DATA STRUCTURES	6	INF/01
COMPUTER NETWORKS	6	INF/01
COMPUTER PROGRAMMING II	6	INF/01
DATABASES AND WEB	12	INF/01
OPERATING SYSTEMS	6	INF/01
SIGNAL PROCESSING	6	INF/01
STATISTICS AND DATA ANALYSIS	6	INF/01
WEB AND CLOUD APPLICATIONS	6	INF/01
Total compulsory credits		54
<b>Elective courses</b>		
<b>Students must acquire 6 credits by choosing the teaching related to one of the following two courses:</b>		
<b>- Digital social media foundations for the "Social and Mobile Computing" path;</b>		
<b>- Computer Graphics for the "Multimedia" path.</b>		
COMPUTER GRAPHICS	6	INF/01
FUNDAMENTALS OF DIGITAL SOCIAL MEDIA	6	INF/01
<b>3rd COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
PRINCIPLES AND MODELS OF PERCEPTION	6	M-PSI/01
Total compulsory credits		6
<b>Elective courses</b>		
<b>TABLE A.</b>		
<b>Optional activities (Social and Mobile Computing path)</b>		
MOBILE COMPUTING	9	INF/01

SOCIAL MEDIA MINING		12	INF/01
<b>TABLE B.</b>			
<b>Optional activities (Multimedia path)</b>			
MULTIMEDIA INFORMATION		12	INF/01
MULTIMEDIA PROJECT		9	INF/01
Students will have to acquire 21 credits, following the teachings of the chosen course:			
- "Social and Mobile Computing" path (Table A);			
- "Multimedia" path (Table B).			
<b>Further elective courses</b>			
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.			
It is not possible to choose courses activated by old study degrees.			
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 <a href="https://www.unimi.it/en/study/student-services/welcome-desk-infostudenti/general-forms">https://www.unimi.it/en/study/student-services/welcome-desk-infostudenti/general-forms</a> 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.			
<b>End of course requirements</b>			
FINAL EXAM		3	NA
PROFESSIONAL STAGES		18	NA
		Total compulsory credits	21

### **COURSE PROGRESSION REQUIREMENTS**

The compulsory prerequisites between the courses are as follows:

<b>Learning activity</b>	<b>Prescribed foundation courses</b>	<b>O/S</b>
SIGNAL PROCESSING	MATHEMATICAL METHODS FOR DIGITAL COMMUNICATION	Core/compulsory
	CONTINUUM MATHEMATICS	Core/compulsory
STATISTICS AND DATA ANALYSIS	CONTINUUM MATHEMATICS	Core/compulsory
ALGORITHMS AND DATA STRUCTURES	COMPUTER PROGRAMMING	Core/compulsory
DATABASES AND WEB	COMPUTER PROGRAMMING	Core/compulsory
COMPUTER PROGRAMMING II	COMPUTER PROGRAMMING	Core/compulsory