

**Department of Information
Engineering and Computer Science**
International programmes

www.disi.unitn.it



**UNIVERSITY
OF TRENTO**



The Department of Information Engineering and Computer Science

Nowadays ICT is pervading everybody's life, digital convergence opens new opportunities and accelerates the speed of economic and social change. The fusion between the physical and digital worlds is radically changing our living environment where individuals and organizations experience an increasing need for shared knowledge and communication. As society becomes more dependent on ICT, a number of vulnerabilities arise due to problems in usability, traceability, security and privacy. In such a context, different and interdisciplinary professionalisms are required.

The Department of Information Engineering and Computer Science (DISI) represents a world-class assembly of researchers and institutions. The Department provides a dynamic and qualified response to the ever-increasing, leading-edge competency demands in the field of ICT, drawing from a productive fabric at local, national and international level.

Our Department covers all the main topics of information technology and engineering and has a strong focus on maintaining the optimal balance between individual disciplines and broad interdisciplinary areas. A wide educational offer, linked to industry, research centres and top universities all over the world makes DISI an international environment, where researchers and lecturers share their knowledge and transfer cutting-edge skills to students and next generation professionals.

The Department covers two primary areas of information and communication technology:

- Computer Science
- Telecommunications

These disciplines are taught individually, but with a strong focus on interdisciplinarity. This gives DISI the ability to integrate the entire spectrum of competences needed to develop advanced technologies that underpin innovative applications and services.

Faculty members are highly productive researchers and international leaders in their respective fields. They are authors of widely used software, patents and textbooks, winners of national and international awards, organizers of international conferences, and successful entrepreneurs. In short, professors, researchers and PhD students at DISI are open-minded people that are able to produce new ideas and services, thus fuelling the future of ICT and knowledge society.

Research conducted at DISI frequently receives coverage on national and international popular media and has an impact both in the research community and at industrial, economic and social level. It relies on the complementary skills of different academic areas in order **to develop innovative methods, technologies, applications and advanced services.**

Our highly integrated internationally collaborative research has three main targets: **frontier research, knowledge transfer, and technology transfer.** To achieve this goal, the scientific activity of the Department is organized in Research Programmes. They represent the synthesis of three different dimensions that define the strategic

research organization of DISI: **methodological research** - where theory is produced and disseminated within the scientific community - **technological areas** - where complementary methodologies meet to create application-oriented technologies - and **application labs** - where researchers cooperate with industry, research centres, and end-users to demonstrate the feasibility of advanced solutions and practice new models for technology transfer.

Living in Trento

Trento (117.000 inhabitants, 190 meters altitude) is set at the intersection of important routes leading to Garda Lake, the Dolomites (UNESCO world heritage), Venice, Verona, Bolzano and Innsbruck.

With its unique geographical position Trento represents on the one hand a crossroads between the Mediterranean and northern Europe cultures, on the other hand a natural production and technology platform for international business and an ideal trading hub between southern and continental Europe.

With a safe urban environment offering many cultural activities, set in an attractive natural landscape, with good employment opportunities, an excellent education system and an efficient health service, Trento is one of the top Italian cities to live in.

The cultural and social life is enriched by numerous conferences, meetings, exhibitions, international festivals (Mountain Filmfestival, Festival of Economics), traditional festivals (Feste Vigiliane), several theatre and musical events both in the city centre, and in the beautiful surroundings (e.g. Sounds of the Dolomites).

The University of Trento is constantly working to develop its international dimension, establishing and strengthening networks and partnerships that guarantee the opportunity of cooperation with regard to education, research and relations with industry.

International students coming to the University of Trento are supported in all the necessary administrative steps related to their arrival and stay in Trento, such as: pre-arrival information, support in VISA and stay permit application, Italian tax code, health insurance, bank account, local transports, information on accommodation and scholarship opportunities, enrolment procedures, socio-cultural events.

Sports activities and facilities as well as special discounts to access gyms, sports centres, swimming pools and ski slopes are available for students who join the University Sports Network (UniSport).





Master in Information and Communications Engineering

The Master in Information and Communications Engineering aims to train professionals to produce and manage technological innovation and fulfil high-profile technical and/or managerial roles in contexts that require in-depth knowledge of information engineering disciplines, focusing on specific aspects of telecommunications engineering.

The course is divided into three areas:

- **Signal Processing and Understanding**, aimed to provide vertical expertise in the design and analysis of information for various application areas such as multimedia, environmental remote sensing, assistive technologies and biomedical, digital security and smart cities.
- **Wireless and Networking**, which aims to provide in-depth expertise in the study, design, and development of wireless systems for communications/radar and telecommunications networks, as well as their application in the terrestrial and aerospace sector.
- **Business and Information Engineering**, to specialize in organizational methods, management and innovation at the level of enterprise and the ICT market.

Most courses include laboratory classes to provide students with a thorough practical knowledge, as well as a broad theoretical background in the subjects of interest.

Programme overview

Main application deadline	Non-EU: January/February each year EU citizens and non-EU citizens living in Italy: June and September each year
Intake	September each year
Duration	2 years full time
Minimum requirements	<ul style="list-style-type: none">• Bachelor's degree in: Information and Communication Engineering; Electronic Engineering and Telecommunications; Telecommunications Engineering; Information and Business Organisation Engineering• A number of ECTS credits in the previous academic career in specific SSD groups at least equal to the minimum specified in the table in Article 4 of the Didactic Regulations of the course.
Selection criteria	First-level education profile; English skills; Motivation, other competences and qualifications
Special opportunities	Double Degree with Centrale Supélec T.I.M.E., Paris (France) and within EIT Digital programme with universities in Finland, France, Germany, Hungary, Netherlands, Spain and Sweden
Further information	mtlc.disi.unitn.it
Contacts	mastertlc@disi.unitn.it

Career opportunities

Our Information and Communication (IC) Engineers fulfil 21 European ICT professional profiles among the 23 recently defined by the European Union. To report just a few of them: Business Information Manager, Systems Analyst and Architect, ICT Operation Manager, Developer, Digital Media Specialist, Network and Technical Specialist, ICT Security Manager, ICT Trainer and Consultant.

In general, our IC engineers acquire know-how in:

1. the design, testing, validation, control, and production of new devices ranging from networks of wireless nanosensors to large aerospace systems;
2. the creation of software for the analysis, understanding, transmission, and exploitation of information in all its physical instantiations;
3. the organization and management of communication systems as well as all aspects related to their innovation and marketing.

Admission requirements

To enrol on the MSc in Information and Communication Engineering, students must hold an undergraduate degree or other qualification obtained abroad and deemed equivalent.

The enrolment to the course of study is also conditioned to the evaluation of the curriculum requirements and of the outcome of the previous academic career.

The students who have the academic requirements needed to access the Master are:

- undergraduates in Information and Communication Engineering (Class L-8) Ministerial Decree 270/04 at the University of Trento, undergraduates in Electronic Engineering and Telecommunications (Class L-8) Ministerial Decree 270/04 at the University of Trento and undergraduates in Telecommunications Engineering (Class 9) Ministerial Decree 509/99 at the University of Trento;
- undergraduates in Information and Business Organisation Engineering (Class L-8) Ministerial Decree 270/04 at the University of Trento;
- holders of a degree in the class L-8 obtained in another universities;
- a number of credits in the previous academic career in specific SSD groups at least equal to the minimum specified in the table in Article 4 of the Didactic Regulations of the course.

Fluency in written and spoken English is required, certified by one or more internationally recognized certificates, issued no more than 3 years before.

Master in Computer Science

The MSc in Computer Science focuses on knowledge, methodologies and specialized computer technologies which will give students the opportunity to plan, design, develop, estimate and manage complex or innovative systems for the processing of information.

The goal of the MSc in Computer Science is to teach students the basic theoretical principles of computer science to acquire specific knowledge in the macro-areas related to software technologies, systems and networks, multimedia, embedded systems, safety and security engineering.

All courses of study include theory and lab classes. Computer Science graduates are often employed within 2 months of leaving the university (if not before completing their studies - source Almalaurea) since Computer Science jobs are on the top five list of most wanted specialists in Italy.

A strong international approach is one of the key features of the MSc in Computer Science. Courses are taught in English, 20% of our teaching staff comes from abroad and about 40% of master students are foreigners. The reason behind this is simple: to be a Computer Science professional today means to be working in a global market where the English language is fundamental and where you'll be exposed to different cultures that can potentially lead to the creation of an international network of contacts to utilise later in life.

Programme overview

Main application deadline	Non-EU citizens living abroad: January/February each year EU citizens and non-EU citizens living in Italy: June and September each year
Intake	September each year
Duration	2 years full time
Minimum requirements	<ol style="list-style-type: none">1. A three-year first-level degree (Bachelor's degree or similar) in Computer Science, or closely related disciplines, awarded by an internationally recognized university-level institution.2. Strong background in at least 4 of the following areas: algorithms and data structures; computational complexity, computability, and logic; computer programming; database systems; software engineering; operating systems; computer networks3. Fluency in written and spoken English (B1 Level for EU students and B2 for non EU students)
Selection criteria	First-level education profile; English skills; Motivation, other competences and qualifications
Special opportunities	Double Degree within EIT Digital programme with universities in Finland, France, Germany, Hungary, Netherlands, Spain and Sweden
Further information	mcs.disi.unitn.it
Contacts	mastercs@disi.unitn.it

Career opportunities

Graduates in Computer Science are employed to plan, organize, develop, manage and maintain IT systems. For students who decide to continue with doctoral studies, management careers should come available, based on their solid skills and problem solving abilities that goes together with the ability to work in a team and to present innovative proposals. Individual capabilities are of great importance too: enterprising young people create innovative companies in the IT sector.

Graduates can work in many different areas, according to ISTAT (Istituto Nazionale di Statistica) professional opportunities list, as:

- IT technicians
- IT and telematics technicians
- Researchers, graduate technicians and similar
- Entrepreneurs and managers of privately-owned companies servicing enterprises, the banking sector and similar sectors
- Entrepreneurs, managers and persons in charge of small enterprises in servicing enterprises, the banking sector and similar sectors

Please note however that this list is constantly updated, as the Computer Science and Technologies development is continuously evolving.

The connections with leader industries are very close: IBM, for example, comes every year to present their cutting edge products, and Microsoft has founded in Trento the only Bioinformatics research centre in Italy.

Admission requirements

To apply to the MSc in Computer Science, students must hold a Bachelor's degree in Computer Science, or closely related disciplines, awarded by an internationally recognized university-level institution; such degree must contain a minimum collection of courses related to programming, algorithms, data management, system architectures (hardware, operating systems, networks), mathematical notions related to calculus, discrete mathematics, probability and statistics. More in-depth notions related to architecture, operating systems, algorithms, networks, language theory and web are required depending on the selected specialization.

To participate in the selection procedure, students must submit a formal application request containing the following information:

- the detailed study plan of the Bachelor's degree, including title and syllabus of all the courses.
- a document from the University that awarded the Bachelor's degree reporting (in Italian or English) the list of courses, the score obtained in each of them and the final score associated to the degree;
- work and professional experiences;
- level of knowledge of the English language, certified by internationally recognized organizations or by the University that issued the Bachelor's degree;
- a motivation letter, explaining why they want to apply to the MSc in Computer Science, and what they expect from it.

Master in Human-Computer Interaction (MHCI)

In collaboration with the Department of Psychology and Cognitive Sciences

The Master in Human-Computer Interaction (MHCI) aims at investigating people and their actions as a starting point for the purposes of technology design. It provides an effective approach to address the many challenges (public engagement, participation, privacy, emotion) currently faced by computer sciences.

The ultimate goal of the Master is to train a new generation of researchers and professionals, who can understand the complexity of human cognition, behaviour and emotion at a micro-, meso- and macro-level and are able to embed this knowledge in new computing artefacts and technologies matching the most diverse human values, interests and needs.

MHCI aims at training professional figures and researchers with a wide range of multidisciplinary skills to understand, design and evaluate new interaction possibilities between human beings and IT devices.

The Master is structured into three specialisation areas:

- social-cognitive area: brain/mind interaction and cognitive ties;
- computer science area: user-interfaces; user-centred design; participatory design; human-machine interaction; prototyping of interactive systems, affective computing, e-learning;
- methodological area: qualitative and quantitative methodologies; visual, ethic and epistemological planning.

Specific learning outcomes:

- acquaintance with simulation, observation and experimental methods in the study of the interaction between human beings and complex systems;
- ability to plan a user-centred design of user interfaces;
- theoretical and practical knowledge of communication and decision-making processes;
- secure knowledge of quantitative and qualitative data collection and analysis;
- capability to analyse decision-making processes, at individual and collective level, in organisational, economic and social contexts;
- capability to autonomously carry out basic and applied research activity.

By virtue of its interdepartmental nature, the course:

1. offers an integrated programme that allows students to pursue their own research interests in an interdisciplinary research environment;
2. fosters the development of research skills in areas that several departments are concerned with;
3. provides specialised skills which are not included in traditional degree courses.

Programme overview

Main application deadline	Non-EU citizens living abroad: January/February each year EU and non-EU citizens living in Italy: June/July each year
Intake	September each year
Duration	2 years full time
Minimum requirements	<ul style="list-style-type: none">• Bachelor's degree and/or official university transcripts.• A first-level degree (at least three years) awarded by an internationally recognized university-level institution is the minimum requirement in order to apply for MHCI.• You are required to scan a copy of your degree and attach it to the application in the dedicated area.
Selection criteria	<ul style="list-style-type: none">• Curriculum vitae and motivation letter• English language certificate –B2 CEFR level or higher• Recommendation letters• Specific preparation in Information science and/or Psychology attested by bachelor degree's exams
Further information	international.unitn.it/ict-mhci
Contacts	mhci@unitn.it

Career opportunities

Graduates will acquire a solid background in the field of communication technologies for the creation and development of user-oriented and environmentally sustainable products and interfaces, thus meeting a demand which has been constantly increasing on the market of new technologies.

They can be employed in both the private (e.g. marketing, research, industries dealing with the creation and development of products requiring a human interface), and the public sector (e.g. health, services, research).

Graduates can also become self-employed and work as consultants for private and public institutions concerned with the analysis and development of human-computer interaction, ergonomic systems and computational models of cognitive processes.

Admission requirements

Applicants having the minimum requirements will be selected according to the following criteria

- Curriculum vitae and motivation letter
- English language certificate –B2 CEFR level and above
- Recommendation letters
- Specific preparation in Information Science and/or Psychology attested by bachelor degree's exams

The MHCI Admission Committee strongly relies on motivation letters to select the most motivated applicants. In the online application, students are asked to submit a statement of maximum 4,000 characters where they provide information on their motivation for the Master's program, extracurricular activities and work experience.

Letters of recommendation should be written by your university professors and/or by managers in your company. A mixture of academic and business letters of recommendation may be the best solution if you have some significant work experience after graduating. Complete the section "Referees" in the online application form with the information required about your referees and ask your referees to send the letter directly to us (mhci@unitn.it) specifying your name in the subject line. We strongly encourage you to use the sample reference letter in the Download box. Contact us immediately if you or your referees have any problem.



Master in Quantitative and Computational Biology (QCB)

In collaboration with CIBIO (Centre for integrative biology), the Department of Physics and the Department of Mathematics

The Master in Quantitative and Computational Biology (QCB) is a multidisciplinary degree that formally integrates quantitative sciences and applied biology.

The course focuses on a strategic area where technology and methodology enable students to face essential questions at the interface between fundamental research and clinical and pre-clinical areas, through analytical and quantitative approaches.

The course - entirely taught in English - is designed to capture the increasing need for researchers and experts able to transform the enormous amount of biological information ("big data") into knowledge, and to gain quantitative insight into the behaviour of biological systems by means of bio-mathematical and bio-physical models.

Key target areas include pharmacogenomics, biotechnology, food science, and precision medicine, which represent applied research fields where the growing availability of multidimensional data demands high interdisciplinarity.

The QCB course is designed to train **experts in biotechnology, computational biology, bioinformatics and biological data and systems biology analysis**, who will have the opportunity to learn in a multidisciplinary context, interacting with students with different experiences. Strong emphasis will be given to quantitative and computational aspects, with a focus on tools to analyse, model and understand biological systems and phenomena.

The course consists of two tracks, the "Biotechnological Track" and the "Computational Track".

Admitted students will follow one of the two tracks based on their educational background acquired in previous studies. The two different tracks offer the opportunity for students to integrate their background based on their first-level degree and individual preparation. In the first, second and third semesters, students will take different courses with a focus on biotechnological or computational topics. The fourth semester is entirely dedicated to the preparation of the thesis.

Students will have the chance to carry out research projects within the University of Trento organizations involved in the Master's Degree, at other Italian or European Universities, or in companies operating in the biotechnology, bioinformatics and computational areas.

Programme overview

Degree Awarded	Master of Science in Quantitative and Computational Biology
Intake	September
Duration	2 years
Teaching Language	English
Location	Centre for Integrative Biology (CIBIO)
Application deadlines	non-EU citizens living abroad: January/February each year EU citizens and non-EU citizens living in Italy: June/July each year
Admission requirements	Bachelor's degree in biotechnologies, computer science, mathematics, physics or related fields; B1 English language knowledge
Further information	international.unitn.it/ict-mqcb
Contacts	masterbio@unitn.it

Courses

Biotechnological Track

Mandatory courses

1st year: Biostatistics; Scientific Programming; Genomics; Biotechnology Engineering 1st year
English B2 level (3 credits)

Three elective courses among:

1st year: Modern Physics; Bioinformatics; Biological Networks

2nd year: Computational Biophysics; Data Mining; Mathematical Modelling; Biotechnology Management and Regulations

Computational Track

Mandatory courses:

1st year: Molecular Biology of the Cell; Chemistry and Biochemistry; Biological Networks

2nd year: Mathematical Modelling

English B2 level (3 credits)

Three elective courses among:

1st year: Modern Physics; Bioinformatics

2nd year: Computational Biophysics; Data Mining; Biotechnology Management and Regulations

Additional credits for both tracks:

One free choice course

Traineeship

Thesis

Complete Programme 120 ECTS

Career opportunities

Students of the QCB Master will be trained for the following professional profiles:

- Biotechnologist
- Computational Biologist
- Bioinformatics technician
- Biologists data and systems biology analyst

The profiles are characterized by a set of shared competences and by specific expertise in the field of biotechnology, information technology and/or mathematics and physics.

Graduates, trained for the above mentioned professions, will be able to use publicly available biological data and to work closely with biologists, clinicians, pharmacologists, engineers, epidemiologists in experimental research and pre-clinical context, in analysis/hospital laboratories, by using a common language.

Admission requirements

To be admitted to the QCB Master, students must have a first-level university degree, or another degree recognized as valid, in the fields of Biotechnology, Information Engineering, Life Sciences, Science and agro-food Technology, Sciences and Chemical Technologies, Pharmacy, Physics, Computer Science, Mathematics and have obtained at least 6 ECTS in the following area: Biology or Chemistry, Mathematics, Physics and Computer Science or Information Engineering. More details are available on the website: international.unitn.it/mqcb

An English language certificate of B1 level or equivalent is required if the Bachelor's degree courses were not taught in English. Each student must submit a complete online application package, which provides the University with fundamental information that the Admissions Committee will use to evaluate candidates on the basis of their proficiency, as well as on their potential to further develop their skills.

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Contacts

Department of Information Engineering and Computer Science

via Sommarive, 9 - 38123 Povo (Trento), Italy

phone: +39 0461 283966

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