Politecnico di Torino

ACADEMIC REGULATIONS

Master's degree programme

in

COMMUNICATIONS ENGINEERING

Department of Electronics and Telecommunications

Collegio di Ingegneria Elettronica, delle Telecomunicazioni e Fisica

Academic Year **2025/2026**

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SUMMARY

Art. 1 – Specific learning objectives and career prospects

1.1 Specific learning objectives

The Master's degree programme in Communications Engineering has a strong focus on design and research and provides methodologies for analysing complex systems. Graduates can be hired by highly competitive companies, top-tier industrial or public research centres, or they can continue their studies at doctoral level.

1.2 Career prospects

The Master's degree programme aims to train a variety of professional profiles. The career prospects and the main functions and competencies associated to each profile are illustrated below.

Professional profile	Main functions and competencies
Specialist engineer in design and development of communication networks and telematic services	Functions: These professionals take part in the design, development, and production phases of devices. Design and development typically cover the following areas: 1. creation and distribution of multimedia content across various application domains, ranging from traditional approaches (e.g., TV broadcasting) to video distribution over the Internet using innovative paradigms such as cloud computing and Peer-to-Peer systems. 2. design of systems/devices for computer networks in contexts ranging from medium-to-large local networks to transport networks operated by national and international telecommunications providers. 3. development of innovative Internet applications and large-scale information systems. These activities include defining system architecture requirements, selecting software and hardware components, and specifying and developing new components. Competencies: *Entry-level competencies:* Graduates must be able to: • Read and understand network standards • Use network protocols/architectures and programming languages • Apply modelling, simulation, and optimisation techniques commonly used in the field • Keep up with the evolution of protocols, architectures and network services • Participate in the design of equipment, systems and hardware/software components • Apply testing criteria for components, systems and subsystems • Draft specifications and technical documentation • Support and coordinate project team activities *Senior-level competencies*: In a lifelong learning perspective, senior professionals must be able to continuously design innovative solutions for telematic systems and services that meet evolving user's needs. They are expected to supervise and coordinate work groups, building on the experience and maturity gained throughout their career. Achieving this level requires complementing academic knowledge with experience-based skills. Potential Employers: Companies that design and/or produce components, devices, and protocols for telematic networks, both in Italy and abroad. Opportunities also exist in companies developing telematic applications such as multimedia content distribution over the Internet or cloud computing applications.
Technical pre-sales marketing specialist	Functions: In large companies involved in the production or management of telecommunications equipment and/or telematic networks, these engineers play a key role in marketing and technical pre-sales activities.

	Competencies: *Entry-level competencies:* Graduates must be able to: • provide high-level technical support during client interactions • collect customer requirements and send them to the design team • draft technical specifications for telecommunications systems *Senior-level competencies:* Senior professionals must remain constantly updated on the evolution of enabling technologies in telecommunications and assess their impact on the design of telecommunications systems and telematic services. They are expected to lead and coordinate teams, leveraging their professional experience. Reaching this level requires integrating academic training with knowledge and skills acquired on the job. Potential Employers: Telecommunications companies that sell hardware, firmware, or software for telecommunication systems and telematic networks.
Engineer specialist in management of telecommunication equipment and telematic networks	Functions: These professionals manage, monitor, maintain and update telecommunication and telematic equipment and networks, as well as related hardware and software information systems. They are responsible for: • managing faults and alarms • continuously upgrading and improving network architecture and protocols to meet users' evolving needs • interpreting studies on future application scenarios to optimise network evolution • ensuring data security Competencies: *Entry-level competencies*: Graduates must be able to: 1. Stay constantly updated with new trends in the field 2. Read and interpret relevant regulations 3. Use network protocols, architectures, and programming languages 4. Apply modelling techniques commonly used in the industry 5. Compare the cost-benefit trade-offs of different solutions 6. Draft technical specifications and documentation 7. Draft specifications and manuals 8. Contribute to managing and coordinating work groups *Senior-level competencies:* Senior engineers must follow the rapid evolution of network architectures and applications, leading the management of medium-scale computer networks. This role requires combining foundational academic knowledge with skills gained through professional experience. Potential Employers: Telecommunications and telematic service providers, as well as medium/large organisations (e.g., banks, public administration) with complex internal telematic networks.
Freelance engineer / consultant	Functions: Graduates can work as consultants for companies, public bodies and other organisations, even outside the telecommunications and telematics sectors. They may also contribute to the development of international standardisation regulations and patents. Competencies: *Entry-level competencies:* Consultants must be able to: • Understand international standards • Contribute to specification, design, prototyping, and production phases of telecommunication networks • Select components based on cost-performance trade-offs

	• Propose new components that meet project requirements • Draft technical specifications and serve as intermediaries between clients and designers • Teach and deliver training activities • Provide expert opinions for courts or companies *Senior-level competencies:* Senior consultants must follow the fast-paced evolution of network architectures and applications and learn to coordinate small-to-medium teams of engineers and technicians. Achieving this level requires a combination of academic knowledge and work-based experience. Potential Employers: Freelancers typically work independently or are employed by consulting firms.
ICT Researcher	Functions: These professionals actively contribute to R&D teams within: • national and international fixed, mobile, and broadcasting communication providers • companies that produce telecommunications equipment, hardware, and firmware • universities and public research centres Competencies: *Entry-level competencies:* Graduates must be able to: 1. Contribute with their own original ideas to research projects 2. Write research project proposals 3. Coordinate research activities 4. Draft technical reports 5. Manage and coordinate human resources 6. Read and analyse documents and reports *Senior-level competencies:* Throughout their career, researchers contribute to advancing scientific knowledge in telematic networks through publications and patents. They must build a strong reputation within the research community and, over time, lead small research teams and guide junior researchers. Potential Employers: • R&D departments of major telecommunications companies • Italian and international universities and technical institutions
Telecommunications device designer	Functions: In companies involved in the development of hardware, firmware, and/or software for telecommunications systems, graduates actively contribute to development, engineering, and production. Competencies: *Graduates must be able to:* 1. Participate in and coordinate hardware, firmware, and/or software development 2. Draft technical specifications and documentation, based on the analysis of international standards 3. Manage and coordinate human resources *Senior-level competencies:* Senior designers must continuously conceive innovative solutions for systems and components, leveraging the latest and most suitable enabling technologies. They must supervise and coordinate teams, drawing on their extensive professional experience. Achieving this level requires integrating academic preparation with on-the-job learning. Potential Employers: Telecommunications companies that develop hardware, firmware, or software for telecommunications systems (e.g., satellites, microwave links, mobile systems, optical fiber networks).

1.3 Professional profiles (ISTAT codes)

With reference to the list of professional profiles classified by ISTAT (Italian National Institute of Statistics, https://www.istat.it/en/), graduates from this Master's degree programme can work as:

ISTAT code	Description
2.1.1.5.1	Specialisti in reti e comunicazioni informatiche
2.2.1.4.3	Ingegneri in telecomunicazioni

Art. 2 – Admission requirements

Italian regulations on enrolment in Master's degree programmes require Italian universities to check that applicants meet the following requirements:

- have a **three-year Bachelor's degree or university diploma**, or **other educational qualification obtained outside Italy** and recognized as suitable for admission;
- meet specific curricular requirements;
- have an **academic performance considered suitable** for admission.

CURRICULAR REQUIREMENTS

As far as curricular requirements are concerned, applicants must have a Bachelor's degree or a three-year university diploma, or an educational qualification obtained outside Italy and recognized as suitable for admission. In addition, they must have gained specific knowledge and competencies in their previous academic path (credits in specific Scientific Disciplinary Fields).

In particular, applicants must have earned:

- minimum 40 credits earned in the following Scientific Disciplinary Fields (settori scientifico-disciplinari): FIS/01, FIS/03, INF/01, ING-INF/05, MAT/02, MAT/03, MAT/05, MAT/06, MAT/08
- minimum 60 credits earned in the following Scientific Disciplinary Fields (settori scientifico-disciplinari): CHIM/07, INF/01, ING-IND/10, ING-IND/13, ING-IND/14, ING-IND/31, ING-IND FIS/01, FIS/03, INF/01, ING-INF/05, MAT/02, MAT/03, MAT/05, MAT/06, MAT/08 /33, ING-INF/01, ING-INF/02, ING-INF/03, ING-INF/04, ING-INF/05, ING-INF/06, ING-INF/07, MAT/05, MAT/06 MAT/08, MAT/09, SECS-S/01.

The credits of the Scientific Disciplinary Fields found both in the first group and in the second group are primarily counted for the first group. The remaining credits are counted for the second group. Therefore, the credits of a course can be counted partly to reach the minimum number of credits of both groups.-.

Applicants who lack less than 10 credits can be admitted to the programme by the Academic Advisor of the degree programme. For applicants who lack more than 10 credits, the evaluation will be subject to the final approval of the Coordinator or the Vice coordinator of the degree programme.

Applicants who do not meet the curricular requirements are required to make up for their unfulfilled curricular requirements (missing credits) before enrolment, by means of:

- **enrolment in single courses in order to make up for unfulfilled curricular requirements**: this is possible for students who need to earn up to a maximum of 60 credits. Students who enrol in single courses for this reason are allowed to include in their Personal Study Plan exclusively the courses assigned by the evaluator.
  or else,
- **credit transfer at Bachelor's level**: this is possible for students who need to earn more than 60 credits. In this case, students need to enrol in the Bachelor's degree programme that offers the credits in the specific Scientific Disciplinary Fields (core subjects and commentary subjects) required for admission to this Master's degree programme.

SUITABLE ACADEMIC PERFORMANCE

Applicants must have a suitable academic performance and an English language certificate (B2 level or above, as defined by the Common European Framework of Reference for Languages: Learning, Teaching, Assessment - CEFR).

The academic performance will be assessed as follows.

1) Applicants from Politecnico di Torino

a) applicants can be admitted to the programme if they earned their Bachelor's degree in:
- 4 years or less (1) - no exam average grade required;
- between 4 and 5 years (1) –exam weighted average grade required (2): ≥21/30
- more than 5 years– exam weighted average grade required (2): ≥ 24/30

b) admissions by merit-based evaluation of the Evaluation Committee

Applicants who do not have the above-mentioned average grade can take an admission test if they earned their Bachelor's degree in:

- between 4 and 5 years (1) –exam weighted average grade required (2): < 21/30
- more than 5 years– exam weighted average grade required (2): > 21/30 and < 24/30

provided that during their Bachelor's path the weighted average grade of the exams belonging to the Scientific Disciplinary Fields (settori scientifico-disciplinari) ING-INF/03 e ING-INF/05 is ≥ 24/30

The details of the admission test are available in the section below "Merit-based evaluation for applicants from Politecnico di Torino and from other Italian universities".

The weighted average grade is calculated on all accrued course credits (graded on a scale of 30) counting towards the achievement of the Bachelor's degree, after having subtracted the worst 28 credits.

The duration of the Bachelor's path is calculated on the basis of the number of academic years in which the applicant has been enrolled at the university, starting from the first enrolment in the Italian university system:

- for full-time students: the duration of the Bachelor's path is equivalent to the number of academic years of enrolment.
- for part-time students: each year of enrolment is counted as half-year.
- for full-time students taking part in the "Dual Career" programme: each year of enrolment is counted as half-year, as for part-time students.

In the event of credit transfer, the duration of the Bachelor's path must be increased proportionally to the number of credits that have been recognized by Politecnico (10-60 CFU =1 year, etc.). The worst 28 credits must be subtracted proportionally to the number of validated credits.

(1) Applicants must have graduated by the end of the December Graduation Period
*(2) The weighted average is calculated as follows: ∑(grade*credits) / ∑credits*

2) Applicants from other Italian universities

a) Applicants who have a Bachelor's degree awarded by another Italian university must have a weighted average grade of all the exams ≥ 24/30, regardless of the number of years it took them to graduate. The weighted average grade (∑(grade*credits) / ∑credits) is calculated on all accrued course credits (graded on a scale of 30) counting towards the achievement of the Bachelor's degree, after having subtracted the worst 28 credits.

b) admissions by merit-based evaluation of the Evaluation Committee.

Applicants with a weighted average grade > 21/30 and <24/30 can take an admission test (merit-based evaluation), provided that during their Bachelor's path the weighted average grade of the exams belonging to the Scientific Disciplinary Fields (settori scientifico-disciplinari) ING-INF/03 and ING-INF/05 is ≥ 24/30.

The details of the admission test are available in the section below "Merit-based evaluation for applicants from Politecnico di Torino and from other Italian universities".

<u>Merit-based evaluation for applicants from Politecnico di Torino and from other Italian universities</u>

The merit-based evaluation (admission test) aims to ascertain specific requirements in order to verify that prospective students have the knowledge, competencies and aptitude to the contents and learning objectives of the Master's degree programme. The admission tests consist in an oral interview (it cab be also a remote interview) about the subjects of the following Scientific Disciplinary Fields: ING-INF/03 and ING-INF/05.
A positive evaluation (offer of admission) allows applicants to enrol in the programme only in the academic year in which the evaluation has been given. Admitted applicants who do not complete the enrolment process within the deadlines are required to apply again and retake the admission test in the next academic years.
Students from Politecnico who have been admitted to the programme and have advanced some Master's courses (taken during their Bachelor's path) are allowed to enrol without retaking the admission test also in the next academic year, provided that

they meet the other admission requirements.

3) Applicants with a non-Italian educational qualification

To be admitted to Politecnico Master's degree programmes, applicants must have an academic qualification awarded by an accredited/recognized foreign university, earned after completing at least 15 years of total education (including primary school, secondary school and university).
Applicants who have attended a university programme lasting five or six academic years (different from the 3+2 system) without completing it must still meet the minimum requirement of 15 years of total education (of which at least 3 years at university level) and they must have earned at least 180 ECTS credits or equivalent. Pre-university courses or foundation years cannot be counted towards the minimum number of credits or the minimum numbers of years of total education mentioned above.
The applicant's academic performance and the consistency between the degree programmes offered by Politecnico and the applicant's previous academic background are assessed by the professors designated by Coordinator of the Collegio. The evaluation is carried out on the Apply@polito platform under the section called "applicants with a non-Italian qualification."

A positive evaluation (offer of admission) allows applicants to enrol in the programme only in the academic year in which the application has been submitted. Admitted applicants who do not complete the enrolment process within the deadlines are required to apply again to the programme in the next academic years.

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More information is available at https://www.polito.it/en/education/applying-studying-graduating/admissions-and-enrolment/master-s-degree-programmes

Art. 3 – Programme curriculum

3.1 Programme overview

Through an interdisciplinary approach, the Master's degree programme in Communications Engineering provides methodological skills in telecommunications, computer science and other fields of information engineering. These skills are essential for designing complex telecommunication systems as well as advanced telematic networks and applications in an innovative way.
The programme focuses on methodological content rather than merely descriptive notions, training specialists with solid, long-lasting competencies that enable graduates to enter the job market immediately after graduation and provide them with the foundations for continuous professional development.

The programme includes a wide range of design activities, practical exercises, and laboratory work, which together account for at least 55% of the total credits earned during the Master's degree programme.

At the end of the educational path students must work at a thesis project, a key learning activity that allows students to consolidate their preparation by working both autonomously and within a team. The thesis may involve research, design, or advanced development activities carried out either at Politecnico or at an external company.

The preparation activities for the thesis must be described in a written paper that must demonstrate both a solid understanding of the topic and strong communication skills. Part of the thesis credits is earned through two project-based courses, thanks to the teaching methodology adopted in these learning activities.

3.2 Organization of educational activities

The list of courses (compulsory and optional), curricula, possible organization of courses into modules, any pre-requisites and exclusions and the list of the faculty members responsible for the courses are available at: https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_a_acc=2026&p_sdu=37&p_cds=467

The list of the Scientific Disciplinary Fields (Settori Scientifico Disciplinari) for each activity (specific subjects and complementary subjects) is available at: https://didattica.polito.it/pls/portal30/sviluppo.vis_aiq_2023.visualizza?sducds=37467&tab=0&p_a_acc=2026

Art. 4 - Student career

The Student Guide is published on the Teaching Portal every year before the beginning of the academic year. There is a specific Student Guide for each Master's degree programme. The Student Guide is available on the web site of the degree programme.

It contains information and deadlines on:

- academic calendar;
- Personal Study Plan and Annual Personal Study Plan;
- free choice credits;
- internships;
- tuition fees;
- dual career;
- classes and exams;
- class delivery;
- foreign language learning;
- studying abroad/mobility programmes;
- exam rules;
- transfers in/out and internal transfers;
- interruption, suspension, withdrawal, forfeiture;
- credit transfer.

Art. 5 - Final Examination

The final examination is worth 30 credits. Developing and writing a thesis normally requires a period of approximately 6 months of full-time work. The final examination consists of a 30-credit thesis or, alternatively, a 12-credit internship in a company followed by an 18-credit thesis.

The Final Examination involves an analysis, a project, or an innovative application, on a topic that must be consistent with the educational objectives of the degree programme. Students are required to write a final written document (Master's thesis). The courses offered in Year 2 are organized in a way that leaves sufficient time for the development of the thesis. Students who have completed all the exams are eligible to be admitted to the final examination.

The Master's thesis serves as a comprehensive assessment of the student's mastery of technical content, organizational and communication skills, and individual work capabilities in relation to complex analyses or projects. The final examination typically requires the application of knowledge gained from multiple courses, the integration of additional elements and the ability to propose innovative ideas. The topic and the activities connected with the thesis must be agreed upon with a faculty member from the Politecnico (a thesis supervisor and an internship tutor, if this is the case). Students are allowed to work at their thesis project also at external organizations or companies, in Italy or abroad, under the supervision of a thesis supervisor from Politecnico and a tutor from the external institution.

Students are required to publicly present and discuss the preparation activities for their thesis and the corresponding results (oral defence) in front of a Graduation Examining Committee, who will evaluate both the work carried out and the presentation.

The Master's thesis and its oral defence must be in English.

Students must submit their thesis application and request the thesis topic online through a dedicated procedure available in their personal page on the Teaching Portal, under the section entitled "Thesis," in compliance with the Graduation Periods deadlines published in the Student Guide – Thematic Calendar Section.

The final grade is given by the Graduation Examining Committee. Its members evaluate the overall average grade of all the exams on a scale of 110. The committee may add up to a maximum of 8 points, considering the following:

- quality of the thesis work (commitment, autonomy, methodological rigor, relevance of results achieved, etc.);
- thesis oral defence (clarity in presentation, etc.);
- outstanding results achieved during the academic path (number of honours, time to graduation).

A degree with honours (lode) may be awarded at the Committee's discretion if the total score is at least 112.51.

If the thesis meets the required standards, the Committee may grant the *dignità di stampa* (printing honour) only if the final grade is 110 cum laude and the Committee's decision is unanimous.

More Information and Deadlines:

- Student Regulations
- Student Guide

Diploma Supplement:
In compliance with article 11, paragraph 8, of Ministerial Decrees No. 509/1999 and 270/2004. Politecnico di Torino issues the Diploma Supplement, a document that can attached to a higher education qualification. It is designed to improve the transparency of international qualifications, as it provides the description of the curriculum successfully completed by the student. This certificate follows the European model developed by the European Commission, the Council of Europe and UNESCO – CEPES: it is issued in two languages (Italian-English) and it is composed of approximately 10 pages.

More information at https://www.polito.it/en/education/applying-studying-graduating/academic-experience/certificates-and-other-documents

Art. 6 - References

6.1 Student Regulations

The Student Regulations define the rights and responsibilities of students and set out the administrative and disciplinary rules that all students enrolled in a degree programme or in a single learning activity at Politecnico must abide by.

6.2 Other Regulations

Particular aspects of students' academic progress are governed by specific Regulations or Calls for Applications published on its website.
In particular:

- The Tuition Fee Regulations specify the annual tuition fees that students must pay. The procedure for requesting a tuition fee reduction is explained in a dedicated guide.
- The University Regulations on Funds for Student Mobility Abroad outline the principles and rules for awarding and disbursing mobility grants. Standard procedures apply to all types of mobility programmes with unified Calls for Applications published twice a year at https://www.polito.it/en/education/applying-studying-graduating/studying-abroad
- The Code of Ethical Conduct also applies to students.