Politecnico di Torino

ACADEMIC REGULATIONS

Master's degree programme
in
DIGITAL SKILLS
FOR
SUSTAINABLE SOCIETAL TRANSITIONS

Interuniversity Department of Regional and Urban Studies and Planning
Collegio di Pianificazione e Progettazione

Academic Year **2025/2026**

The English translation of this document is provided as a support to the student community and has no legal effects. The Italian version shall constitute the sole authentic text and will be referred to for any legal matters.

SUMMARY

Art. 1 - Specific learning objectives and career prospects

1.1 Specific Learning Objectives

The Master's degree programme in Digital Skills for Sustainable Societal Transitions aims to train digital experts who can apply a wide range of digital techniques and methods within the processes that are driving the transition of societies and cities towards new models of interaction, production and consumption. These professionals are expected to collaborate effectively with experts from specific application domains.

The course catalogue contributes to training professionals who can effectively interpret change driven by digital transformation through technological and organizational innovation, even in complex contexts. The training is in line with the needs of increasingly in-demand professionals in industry and business, public administration, digital transformation consultancy services, scientific and technological research centres, as well as in non-profit organizations and the third sector.

The programme has a strong multidisciplinary approach, enabling digital experts to work in teams of professionals with expertise in core computer science areas (programming techniques, database management, data processing), as well as in specific application domains. Graduates will acquire a general understanding of business management and public administration, along with more in-depth knowledge in at least one key area of urban transformation (decarbonization and energy transition, industrial automation, cultural heritage valorisation). During Year 1 the curriculum is enriched by the integration with academic disciplines from the University of Turin, with the goal of strengthening the multidisciplinary approach by providing essential knowledge in the field of digital transformation, including legal aspects and issues related to the management and organization of companies and public institutions.

1.2 Career prospects

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

Professional profile	Main functions and competencies
Specialist in Technological Innovation for Decarbonization Processes	Functions: These professionals propose innovative, data-driven strategies and technological solutions in the fields of energy and environmental sustainability. They Work across IT, administrative, managerial, and communication domains in public and/or private companies and organizations, focusing on urban energy and environmental planning and management, including sustainable mobility. Competencies: • Analytical skills for solving data-driven problems in the energy and environmental sectors; • Ability to define indicators and decision-support tools for monitoring and developing innovative strategies in these sectors; • Ability to collaborate with domain experts and end users to optimize data-based solutions; • Ability to operate in complex and multidisciplinary environments. • Knowledge of multidisciplinary approaches to problem-solving, such as Problem Structuring Methods (PSMs) and Multi-Criteria Decision Analysis (MCDA); • Knowledge of systems thinking applied to the Sustainable Development Goals (SDGs), especially SDG 11, SDG 7 (Energy), and SDG 13 (Climate Action); • Knowledge of data modelling and management, including spatial data and machine learning algorithms for data analysis; • Familiarity with IoT systems and cloud platforms; • Understanding of energy efficiency and energy production/consumption; • Awareness of the ethical implications of data analyses. Potential Employers:

	• Public and private agencies for sustainable economic development; • Public and private agencies for energy management; • Public service agencies working in the field of mobility. • Organizations and institutions seeking expertise in energy and mobility management.
Specialist in Innovative Methods and Tools for the Manufacturing Industry	Functions: These professionals work in the field of digitalizing industrial processes, with a focus on predictive maintenance, development of digital twins, quality control, and integrated production systems management, including the use of Manufacturing Execution Systems (MES). They define innovative, data-driven technological strategies for the manufacturing sector. They work in IT, administrative, and managerial areas in public and/or private organizations. Competencies: • Analytical skills to define predictive maintenance strategies using a data-driven approach; • Proficiency with MES tools for efficient and integrated management of manufacturing processes; • Ability to use augmented reality-based vision systems to support industrial process activities; • Ability to collaborate with domain experts and stakeholders to optimize data-based solutions; • Ability to use knowledge for decision-making; • Ability to work in multidisciplinary contexts. • Knowledge of smart maintenance systems, including IoT architectures, CCMS software, and data analytics techniques; • Knowledge of MES tools and their applications across different scenarios; • Knowledge of data modelling and management, including spatial data and machine learning algorithms; • Familiarity with IoT systems and cloud platforms; • Awareness of the ethical implications of data analyses. Potential Employers: • Manufacturing and service companies; • ICT companies; • Public and private agencies for sustainable economic development.
Specialist in Digital History for Urban Heritage through Digital Tools	Functions: They make use of Information and Communication Technologies (ICT) to critically contextualize the historical processes related to urban heritage, including museums. They design and support projects aimed at identifying tangible and intangible cultural heritage and at integrating and representing cultural data. They are specialized in heritage communication and coordinate communication activities across various media and platforms. They combine strategic and visionary skills to develop new heritage dissemination strategies. They works in IT, administrative, managerial, and communication domains in public and/or private organizations. Competencies: • Ability to spatialize and visualize cultural heritage data using ICT platforms; • Ability to design integrated digital environments for data collection, visualization, and scenario development; • Ability to analyse data using digital methods to create narratives adapted to diverse user contexts; • Ability to work in multidisciplinary environments and apply expertise to the development of digital heritage products, especially in urban contexts with diverse historical layers. • Knowledge of on-site and online digital platforms—such as virtual museums and digital atlases—for representing, spatializing, collecting, managing, and accessing historical and cultural data; • Knowledge of data modelling and management (e.g., spatial and cultural data), and machine learning algorithms for data analysis; • Familiarity with IoT systems, cloud platforms, and sensors applied to heritage contexts; • Awareness of the ethical implications of data analyses.

	Potential Employers: • Cultural heritage institutions (museums, art centres, public and private archives); • Public and private foundations, public administration departments, NGOs, and local authorities engaged in cultural heritage management and promotion.
Specialist in Data-Driven, Innovative and Sustainable Services for Local Enterprises and Institutions	Functions: These professionals operate in the fields of technological innovation and organizational change within enterprises and public institutions, designing new solutions for digital technology adoption. Through a data-driven approach, they propose innovative strategies and technological solutions for workforce management and stakeholder engagement. They works in IT, administrative, managerial, and communication domains in public and/or private companies and organizations. Competencies: • Analytical skills for defining data-driven organizational transformation strategies in companies and institutions; • Ability to use ICT tools for managing and reorganizing internal and external processes with a sustainability-oriented approach; • Ability to collaborate with domain experts and stakeholders to optimize data-based solutions; • Ability to apply knowledge in decision-making; • Ability to operate in multidisciplinary environments. • Knowledge of methodologies and tools for efficient internal process management (e.g., collaborative work platforms, integrated systems); • Knowledge of methodologies and tools for data analysis aimed at enhancing external communication (e.g., social analytics tools, integrated communication management tools); • Familiarity with IoT systems and cloud platforms; • Awareness of the ethical implications of data analyses. Potential Employers: Expert in designing smart and sustainable data-driven solutions across various fields: engineering, architecture, design, cultural and environmental heritage enhancement, and media. Work in roles connecting technical and administrative domains.

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/), a graduate from this Master's degree programme can work as:

ISTAT code	Description
2.1.1.5.2	Analisti e progettisti di basi dati
2.5.1.3.2	Specialisti dell'organizzazione del lavoro
2.5.1.5.3	Specialisti nella commercializzazione nel settore delle tecnologie dell'informazione e della comunicazione

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;

The provisions issued by the Academic Senate and the implementing regulations adopted by the competent academic bodies establish that, for students coming from specific academic backgrounds and with certain academic achievements, the curricular requirements and the suitable academic performance are considered automatically fulfilled.
All other applicants must be assessed by an evaluator. This assessment may result in an offer of admission, rejection, or conditional admission requiring the completion of specific curricular requirements identified by the evaluator.
Enrolment in the Master's degree programme is possible in both first and second semester, provided that students meet the deadlines and the specific requirements for admission.

CURRICULAR REQUIREMENTS

As far as curricular requirements are concerned, applicants must have a Bachelor's degree (D.M.270/2004) belonging to one of the following classes or an educational qualification obtained outside Italy and recognized as suitable for admission:
L-8 Ingegneria dell'informazione L-9 Ingegneria industriale
L-31 Scienze e tecnologie informatiche L-35 Scienze matematiche
(and corresponding classes under D.M.509/1999)

Alternatively, applicants must have a university degree belonging to a different class, provided that they have acquired knowledge and competencies in specific Scientific Disciplinary Fields (settori scientifico-disciplinari), expressed in the form of credits, as below specified:

- minimum 25 credits earned in the following Scientific Disciplinary Fields (settori scientifico-disciplinari): MAT/03, MAT/05, MAT/07, MAT/08, MAT/09, FIS/01, ING-INF/05, INF/01, ING-IND/35, IUS/10, SECS-P/02, SECS-P/07, SECS-P/08, SPS/04, SPS/08, SPS/10;
- minimum 45 credits earned in the following Scientific Disciplinary Fields (settori scientifico-disciplinari): ICAR/06, ICAR/08, ICAR/12, ICAR/14, ICAR/18, ICAR/20, ICAR/21, ICAR/22, L-ART/06, M-GGR/01, M-GGR/02, SPS/07, SPS/09, SECS-P/01, SECS-P/06, SECS-P/09, SECS-P/10, SECS-S/01, SECS-S/03, SECS-S/06, ING-IND/10, ING- IND/11, ING-IND/16, ING-IND/22, M-PSI/01, M-STO/04.

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 may be admitted to the programme by the Academic Advisor. 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 must 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 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

Applicants can be admitted to the programme if they earned their Bachelor's degree in:

- 4 years or less - no exam average grade required (1);
- between 4 and 5 years–exam weighted average grade required: ≥24/30
- more than 5 years– exam weighted average grade required (2): ≥ 25/30

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 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

Applicants who have a Bachelor's degree awarded by another Italian university must have a weighted average grade of all the exams ≥ 25/30, 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.

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.
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."

Applicants who do not have a satisfactory academic performance for admission to the programme will take part in an oral interview on the following topics:

- Action plans for achieving the Sustainable Development Goals
- Strategies and initiatives for digital transition in urban agendas
- Fundamentals of computer science
- Fundamentals of geographic information systems

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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

During the programme students acquire specific knowledge of the key tools and techniques of digital transformation, such as big data, artificial intelligence, machine learning, cloud computing, the Internet of Things, data analytics and social media management. They also gain specific skills related to spatial data and geographic information systems (GIS), which are essential tools for storing, analysing, and supporting decision-making processes, allowing public administrations and private enterprises to play a pivotal role in developing innovative solutions for territorial sustainability.

The course catalogue places particular emphasis on integrating specialised digital competencies with knowledge from the humanities and social sciences. This integration aims to equip students with the ability to apply techniques and methodologies to solve complex, multidisciplinary problems in innovative ways. This approach is especially suited to addressing the complexities of the relationship between information and communication technologies and the territorial contexts in which they are implemented—contexts where the transition to new models of production and consumption is mediated by social practices, public services, and legal frameworks regulating the application of technological innovation.

With a particular focus on cities as drivers of sustainability transitions, combining technical knowledge with competence in human sciences allows to train professionals who can contribute to the development of urban policies that respond to the diverse needs of businesses, public administrations, and communities, while ensuring consistency with emerging forms of territorial innovation.

The educational path is organized around a first year focused primarily on acquiring skills in programming, database management, artificial intelligence, and geographic information systems, alongside fundamental knowledge of business organisation, public administration, social change and the legal regulation of technological innovation. Year 2 focuses on the application of the Internet of Things and other information and communication technologies to the development of sustainable solutions for post-carbon communities.

Students are offered the opportunity to tailor their learning by choosing a highly specialised, professionally-oriented course, chosen from among the courses on urban mobility transitions or on the development of innovative services for the accessibility of cultural heritage.

The programme ends with a design project or a case study, carried out as part of the final thesis, which demonstrates the students' ability to work independently within organisations that use digital technologies. Thesis research activities are conducted as part of internships in companies, public administrations, or research institutes and organisations.

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=81&p_cds=473

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=81473&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 represents a key educational milestone of the Master's degree programme and consists of a thesis that must be independently developed by the student under the supervision of a supervisor and, where applicable, with the collaboration of co-supervisors. The thesis activities typically require the application of knowledge acquired across multiple courses and design studios, the integration of additional elements and the ability to propose innovative ideas.

Students are offered the opportunity to explore in depth a specific topic by developing a thesis with a professionalising orientation. This may include an internship and, in some cases, further investigation in a research laboratory. The thesis topic must fall within the disciplines covered by the study plan of the Master's degree programme and may be related to the internship activities. The topic must be agreed upon with the supervisor. The thesis is presented and defended before a dedicated Graduation Examining Committee. During the oral defence, students must demonstrate their ability to work independently, a thorough understanding of the subject matter and the ability to communicate and defend their work concisely and effectively. The evaluation criteria for awarding the thesis grade include: originality and significance of the results, depth of analysis and methodological rigour, research commitment and independence, clarity and effectiveness of the presentation and the ability to argue and support one's ideas.

The thesis must be written and presented in English.

The expected workload for the thesis is approximately 750 hours, equivalent to 30 ECTS credits, divided into a 20-credit thesis and a 10-credit internship (carried out at public institutions or private organisations). Alternatively, students may choose to combine a 20 thesis credits with a 7-credit internship and a 3-credit research laboratory specifically offered during the final semester.

Students are required to independently investigate a problem by adopting a multidisciplinary methodological approach, with the aim of proposing suitable solutions and contributing to knowledge advancement. The thesis work should be guided by a critical review of the available literature, developed from a technical and design perspective, with the objective of formulating operational proposals for addressing the problem.

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 thesis supervisor must be a tenured professor or researcher from Politecnico, or an external lecturer teaching at Politecnico, as defined in the Student Regulations (Article 11 – Rules for the final examination). If the supervisor does not belong to the Collegio di Pianificazione e Progettazione, he/she must be supported by a co-supervisor chosen among the tenured professors or researchers from this Collegio.

The final examination consists in presenting and defending one's Master's thesis. The Committee in charge of the final examination evaluates the candidates' entire academic path assessing their cultural maturity, ability to develop original ideas and the overall quality of the thesis work.

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 factors:

- quality of the thesis work (originality, relevance of results, in-depth analysis of the topic, methodological rigor, presentation and representation of results, ability to support one's ideas etc.);
- thesis oral defence (clarity in presentation, etc.);
- outstanding results achieved during the academic path (number of honours, experiences at other universities or research centres, extracurricular activities, participation in Student Teams or Societies, etc.).

A degree with honours (lode) may be awarded at the Committee's discretion if the total score reaches at least 110.

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.