Politecnico di Torino

ACADEMIC REGULATIONS

Master's degree programme

in

ENVIRONMENTAL AND LAND ENGINEERING

Department of Environment, Land and Infrastructure Engineering

Collegio di Ingegneria per l'Ambiente e il Territorio

Academic Year **2026/2027**

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 3

1.1 Specific Learning Objectives 3

1.2 Career prospects 3

1.3 Professional profiles (ISTAT codes) 5

Art. 2 - Admission requirements 6

Art. 3 - Programme curriculum 9

3.1 Programme overview 9

3.2 Organization of educational activities 9

Art. 4 - Student career 10

Art. 5 – Final Examination 11

Art. 6 – References 12

6.1 Student Regulations 12

6.2 Other Regulations 12

Annex 1 – Tabella delle Attività Formative 13

Art. 1 - Specific learning objectives and career prospects

1.1 Specific Learning Objectives

The programme aims to train engineers who can address, at an advanced level, the complex issues related to the environment and the territory, particularly those concerning the interaction between natural components (air, water, soil, biosphere) and human activities. This objective requires a highly multidisciplinary background and the development of skills in problem setting, problem solving, and design within the core and related subject areas.

The core curriculum provides knowledge and skills on phenomena and methods through a learning path based on lectures and individual or group exercises aimed at fostering autonomy and proficiency in calculation and modelling techniques.

The specialised and track-specific courses explore technical, technological, and management-related aspects in depth through specialised or multidisciplinary project-based activities. These are designed to train engineers capable of evaluating, planning, designing, implementing, managing, and monitoring processes and works, including: environmental management in enterprises, remediation, assessment and reduction of pollutant emissions, infrastructure and construction sites for strategic projects, protective works and planning, risk assessment and mitigation, emergency management, climate change and its effects, territorial governance, and environmental policies.

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
Engineer specialised in Geo-Engineering	Functions: Environmental and Land Engineers specialised in geo-engineering work in engineering firms as experts in the design and management of excavations and major infrastructure interacting with the territory; in construction companies as site managers or supervisors of excavation works, tunnels, or large-scale projects; in public authorities as experts in the planning and supervision of major infrastructure works; and in public or private companies as quality control experts and safety coordinators during both the design and execution phases. Competencies: • Designing and carrying out excavation and reinforcement works for rocks and soils, support structures for rock and soil both at the surface and underground, and earthworks (e.g. embankments, dams, levees). Activities may include tunnels, roads, railways, dam excavations, quarries, and slope stabilisation. • Performing and interpreting on-site and laboratory investigations and measurements; • Managing excavation sites and major infrastructure works, as well as raw material extraction and processing. Potential Employers: Construction companies, public authorities, design and consulting firms involved in planning, design, and health and safety protection on civil or mining construction sites.
Engineer specialised in Industrial Environmental Sustainability	Functions: Environmental and Land Engineers specialised in industrial environmental sustainability work in companies as experts in the planning, design, and environmental management of processes and pollutant emissions; in design and consulting firms as specialists in environmental quality, management, and remediation; and in public authorities as environmental protection experts. Competencies: • Designing, implementing, and managing systems to enhance the sustainability of industrial/production processes by saving raw materials, water, and energy; reducing

	pollutant and climate-altering emissions; and limiting and managing environmental impacts on various media (water, air, soil); • Designing, implementing, and managing environmental systems such as: treatment plants for pollutants from urban and industrial settlements; waste recovery and disposal plants; facilities for the valorisation of secondary raw materials; and technological interventions for the remediation of contaminated sites; • Designing and implementing environmental quality monitoring systems and restoration interventions; • Predicting, preventing, and mitigating health and environmental risks through the development and use of technical tools such as geographic information systems and environmental monitoring networks for data collection and management, environmental impact assessments, and environmental management systems for infrastructure, processes, plants, and products. Potential Employers: Companies, public authorities, design and consulting firms.
Engineer specialised in Natural Risk Management	Functions: Environmental and Land Engineers specialised in natural risk management work in engineering firms as designers of interventions for the prevention and mitigation of hydrogeological and land instability risks, and as experts in the design and management of digital surveying systems, monitoring systems, and sensor networks. In the corporate sector, they serve as safety coordinators during the design and construction phases and as specialists in assessing natural and climate-related risks for businesses. In public institutions, they act as experts in evaluating natural risks at the territorial scale and in designing and managing monitoring and early-warning systems, including for the development of emergency plans. Competencies: • Assessing natural and climate-related risks affecting urban communities and production sectors (companies); • Designing, implementing, and managing interventions for protection and prevention, such as flood protection structures, slope stabilisation works for soil and rock faces, and drainage systems for unstable ground; • Analysing and controlling extreme natural events through the design and management of monitoring networks and data from ground-based and remote sensors, 3D surveys systems, and geographic information systems; • Applying interdisciplinary knowledge to develop Civil Protection plans and risk prevention strategies for companies and construction sites. Potential Employers: National and regional agencies, local authorities, research institutions, companies or consortia, engineering firms, consulting firms specialising in natural and climate-related risks, and environmental monitoring consultancies.
Engineer specialised in Climate Change	Functions: Environmental and Land Engineers specialised in climate change work in large companies operating in strategic sectors as experts in designing and implementing emission mitigation strategies. They may also work in engineering firms as designers and site managers for works aimed at protecting against the effects of climate change; in consultancy companies as specialists in compliance with national and international climate change policies and regulations; in the innovation sector, where they design mitigation and adaptation solutions; in public institutions as experts in monitoring and managing climate change mitigation actions; and in consultancy or insurance companies assessing major climate-related risks. Competencies: • Climate change forecasting systems; • Innovative technological solutions for climate change mitigation; • Developing and using monitoring networks and geographic information systems to manage data supporting impact assessment and intervention planning; • Planning and implementation of climate change adaptation measures; • Knowledge of international policies and guidelines; • Risk assessment and design, implementation, and management of protective, preventive, and mitigation works;

	• Management of disasters and resource scarcity caused by climate change. Potential Employers: Companies in strategic sectors, innovation-driven companies, research institutions, public bodies and national/international agencies, engineering firms, and consultancy companies.
Preparation for Further Studies	**Prerequisites for continuing studies**
Third level university programmes (Ph.D. programmes or postgraduate Master's programmes)	In-depth knowledge of mathematical tools for analysing engineering problems. Thorough understanding of basic scientific subjects. Strong theoretical knowledge of fundamental engineering disciplines, and specific subjects of the Master's degree programme in Environmental and Land Engineering, and of the related specialist track. Adequate ability to interpret and describe engineering problems using mathematical language. Critical thinking skills in analysing problems and evaluating results. Ability to solve complex problems, including those requiring interdisciplinary approaches, also through innovative methods. Capacity for systemic thinking and problem setting. Ability to conceive, plan, design, and manage complex and/or innovative systems, processes, and services in the field of environmental and land engineering. Language skills and the ability to communicate scientific and technical content in a concise manner. Competence in analysing scientific and technical documentary sources.

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 Bachelor's degree programme can work as:

ISTAT code	Description
2.2.1.2.2	Ingegneri minerari
2.2.1.6.1	Ingegneri edili e ambientali
2.2.1.6.2	Ingegneri idraulici

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 during 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): CHEM-01/A (CHIM/01), CHEM-02/A (CHIM/02), CHEM-03/A (CHIM/03), CHEM-04/A (CHIM/04, CHIM/05), CHEM-05/A (CHIM/06), CHEM-06/A (CHIM/07), PHYS-01/A, PHYS-02/A, PHYS-03/A, PHYS-04/A (FIS/01, FIS/02, FIS/03), PHYS-06/A (FIS/07), IINF-05/A (ING-INF/05), MATH-02/A (MAT/02), MATH-02/B (MAT/03), MATH-03/A (MAT/05), MATH-03/B (MAT/06), MATH-04/A (MAT/07), MATH-05/A (MAT/08), STAT-01/A (SECS-S/01), STAT-01/B (SECS-S/02);
- minimum 60 credits earned in the following Scientific Disciplinary Fields (settori scientifico-disciplinari): BIOS-05/A (BIO/07), CHEM-06/A (CHIM/07), GEOS-03/A (GEO/04), GEOS-03/B (GEO/05), GEOS-04/B (GEO/11), GEOS-04/C (GEO/12), PHYS-01/A, PHYS-02/A, PHYS-03/A, PHYS-04/A (FIS/01, FIS/02, FIS/03), PHYS-05/B (FIS/06), CEAR-01/A (ICAR/01), CEAR-01/B (ICAR/02), CEAR-02/A (ICAR/03), CEAR-03/A (ICAR/04), CEAR-03/B (ICAR/05), CEAR-04/A (ICAR/06), CEAR-05/A (ICAR/07), CEAR-06/A (ICAR/08), CEAR-07/A (ICAR/09), IIND-06/A (ING-IND/08), IIND-06/B (ING-IND/09), IIND-07/A (ING-IND/10), IIND-07/B (ING-IND/11), IMIS-01/A (ING-IND/13), IIND-07/D (ING-IND/19), IIND-03/C (ING-IND/21), IMAT-01/A (ING-IND/22), ICHI-01/A (ING-IND/23), ICHI-01/B (ING-IND/24), ICHI-02/A (ING-IND/25), ICHI-01/C (ING-IND/26), ICHI-02/B (ING-IND/27), CEAR-02/B (ING-IND/28), CEAR-02/C (ING-IND/29), CEAR-02/D (ING-IND/30), IIET-01/A (ING-IND/31), IIND-08/A (ING-IND/32), IEGE-01/A (ING-IND/35), IINF-01/A (ING-INF/01), IMIS-01/B (ING-INF/07), MATH-04/A (MAT/07), STAT-01/A (SECS-S/01), STAT-01/B (SECS-S/02), ECON-07/A (SECS-P/08), INFO-01/A (INF/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.

With regard to curricular requirements, these are automatically fulfilled by students holding a Bachelor's degree in class L-7. In all other cases, admission applications will be assessed by the Academic Advisor of the degree programme or their delegate, who may, with appropriate justification, recognise credit equivalences in scientific-disciplinary sectors other than those specified in these regulations.

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 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

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: ≥21/30
- more than 5 years– exam weighted average grade required (2): ≥ 24/30

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 ≥ 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.

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 threshold of minimum credits or years of total education).

In addition to having an adequate academic background and certified English language proficiency at least at B2 level, students applying for degree programmes taught fully or partially in Italian must also hold a B2-level Italian language certificate, as defined by the Common European Framework of Reference for Languages (CEFR), as an admission requirement.

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.

***

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

The educational programme is organized in four tracks, each with specific objectives:

- Industrial Environmental Sustainability: it provides students with technical and scientific knowledge for designing, implementing, and managing systems, plants, and technological interventions aimed at improving the sustainability of industrial processes, reducing the impact of pollutant loads on air, water, soil, and subsoil, monitoring the quality of natural environments, and remediating contaminated sites.
- Geo-Engineering: it trains students in the design and implementation of surface and underground excavation works and large-scale infrastructure interacting with soil and rock. It provides technical and scientific knowledge for addressing engineering problems related to the stability of surface and underground excavations, the proper exploitation of mineral resources, and the management and organisation of large-scale construction projects affecting the territory.
- Management of Natural Hazards: it offers the technical and scientific background needed to assess, design, implement, and manage interventions, structures, and systems for the prevention and mitigation of natural and climate-related risks; to design systems for the analysis and monitoring—also through remote sensors—of variables associated with natural hazards such as earthquakes, floods, land instability, and extreme weather events; to define technical and regulatory measures for reducing risks through prevention in the workplace and civil protection actions.
- Climate Change: it provides a technical and scientific education aimed at training engineers capable of understanding and modelling climate systems and their interactions with human systems, understanding international policies and guidelines, designing and managing technological interventions for mitigation, planning adaptation strategies, and designing, implementing, and monitoring interventions for the management of natural events and resource scarcity.

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_coorte=2027&p_sdu=32&p_cds=569

The list of the Scientific Disciplinary Fields (Settori Scientifico Disciplinari) for each activity (specific subjects and complementary subjects) is available in Annex 1 to the present Regulations.

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. Students are required to independently carry out an in-depth study of a technical and design-related problem, critically review the available documentation, and develop the problem by proposing appropriate engineering solutions. The work may be carried out at the University's departments and laboratories, at other Italian or international universities, at external research laboratories, or at companies that have established
collaboration agreements with the University.

Students are required to present and defend their Master's thesis before a Graduation Examining Committee. Candidates must demonstrate their ability to work independently, a sound understanding of the subject matter, and the ability to effectively summarise and communicate its content while engaging in a critical discussion.
The thesis may be written and presented in English.

The workload required for the thesis is approximately 400 hours, corresponding to 16 ECTS credits.

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 examination consists in presenting and defending one's Master's thesis.

The presentation must not exceed 12 minutes. It is followed by a short discussion during which the Committee members may ask specific questions.

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 (commitment, autonomy, relevance of results, in-depth analysis of the topic, methodological rigor, etc.);
- thesis oral defence (clarity in presentation, etc.);
- outstanding results achieved during the academic path (number of honours, extracurricular activities).

A degree with honours (cum laude) may be awarded upon achieving a final score of 110, at the Committee's discretion and with a qualified majority, that is, with the approval of at least two-thirds of its members.

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 be 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.

Annex 1 – Tabella delle Attività Formative

Attività	Ambito Disciplinare	Settore	SSD corrisp	cfu min	cfu max
Attività caratterizzanti	Discipline delle interazioni tra attivita antropiche e sistemi naturali	BIOS-05/A - Ecologia	BIO/07	3	8
		GEOS-03/B - Geologia applicata	GEO/05		
		GEOS-04/B - Geofisica applicata	GEO/11		
		PHYS-05/B - Fisica del sistema Terra, dei pianeti, dello spazio e del clima	FIS/06		
	Discipline dell'ingegneria per l'ambiente e territorio	CEAR-01/A - Idraulica	ICAR/01	42	72
		CEAR-01/B - Costruzioni idrauliche e marittime e idrologia	ICAR/02		
		CEAR-02/A - Ingegneria sanitaria- ambientale	ICAR/03		
		CEAR-02/B - Ingegneria e sicurezza degli scavi	ING-IND/28		
		CEAR-02/D - Idrocarburi e fluidi nel sottosuolo	ING-IND/30		
		CEAR-04/A - Geomatica	ICAR/06		
		CEAR-05/A - Geotecnica	ICAR/07		
Attività affini	Attivita formative affini o integrative	CEAR-02/C - Ingegneria delle materie prime	ING-IND/29	12	26
		CEAR-03/A - Strade, ferrovie e aeroporti	ICAR/04		
		CEAR-03/B - Trasporti	ICAR/05		
		CEAR-04/A - Geomatica	ICAR/06		
		CEAR-08/B - Produzione e gestione dell'ambiente costruito	ICAR/11		
		CEAR-12/B - Urbanistica	ICAR/21		
		ECON-07/A - Economia e gestione delle imprese	SECS-P/08		
		GEOS-04/B - Geofisica applicata	GEO/11		
		IEGE-01/A - Ingegneria economico- gestionale	ING-IND/35		
		IIET-01/A - Elettrotecnica	ING-IND/31		
		IIND-02/A - Meccanica applicata alle macchine	ING-IND/13		
		IIND-07/D - Impianti nucleari	ING-IND/19		
		IINF-05/A - Sistemi di elaborazione delle informazioni	ING-INF/05		
		MATH-03/B - Probabilità e statistica matematica	MAT/06		
		MATH-05/A - Analisi numerica	MAT/08		
		PHYS-05/B - Fisica del sistema Terra, dei pianeti, dello spazio e del clima	FIS/06		
		STAT-01/A - Statistica	SECS-S/01		
Altre attività	A scelta dello studente	-		8	14
	Per la prova finale	-		16	20
	Abilita informatiche e telematiche	-		-	-
	Altre conoscenze utili per l'inserimento nel mondo del lavoro	-		-	-
	Tirocini formativi e di orientamento	-		-	-
	Ulteriori conoscenze linguistiche	-		-	-
	Per stages e tirocini presso imprese, enti pubblici o privati, ordini professionali	-		-	-