Politecnico di Torino

ACADEMIC REGULATIONS

Bachelor's degree programme

in

ENERGY ENGINNERING

Department of Energy

Collegio di Ingegneria Elettrica ed Energetica

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 matter.

SUMMARY

Art. 1 - Specific learning objectives and career prospects

1.1 Specific Learning Objectives

The Bachelor's degree programme in Energy Engineering falls within the field of industrial engineering and is characterized by a strong interdisciplinary approach with other industrial engineering sectors.

The programme aims primarily to provide a solid foundational education in thermodynamics, electrical machines and systems, materials technology, structural and mechanical engineering, heat transfer, and fluid dynamics. On this foundation, students acquire specific training in energy engineering, focusing in particular on the main types of industrial and civil energy systems, renewable energy sources, computational methods for heat exchange, building physics and climate control, and basic knowledge of nuclear technologies.

1.2 Career prospects

The Bachelor'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**
Junior Energy Engineer	**Functions:** The energy engineer performs the following functions: • Promotes and develops initiatives to optimize the use of energy resources at a territorial level; • Provides consultancy for the rational use of energy in industrial and civil applications; • Acts as a technical collaborator in the design and installation of thermal systems powered by traditional and renewable energy sources; • Manages energy conversion plants; • Serves as an energy manager in industrial and civil facilities where required by law; • Evaluates the environmental impact, sustainability, and safety of energy systems. Competencies: The energy engineer: • Applies the methodological-operational aspects of energy engineering and basic sciences, interpreting and describing problems related to energy engineering; • Uses standard techniques and tools for the design of components, systems, and processes in the energy and thermal engineering fields; • Performs basic measurements of key energy quantities and analyses and interprets the results in light of the system's energy and mass balance; • Identifies the most suitable engineering technologies and solutions in the civil, industrial, and transport sectors, also assessing their environmental impacts; • Communicates effectively in oral and written form, demonstrating full command of the technical terminology of energy engineering; • Is able to adapt to the rapid technological innovation occurring in the energy sector.. Potential employers • Public and private entities operating in the energy supply sector; • Companies producing energy machinery and plants; • Design, installation, and testing firms for thermal systems and building energy certification; • Public and private organizations where the presence of technical managers responsible for energy conservation and rational use (energy managers) is required.
Preparation for further studies	**Knowledge required for further studies**

Graduates in Energy Engineering with an aptitude for advanced studies may continue their education by enrolling in a Master's Degree Programme or pursuing post-graduate specialist paths.	They are expected to have: • an in-depth theoretical knowledge of mathematics, physics, mechanics, and thermodynamics; • a solid understanding of the fundamentals of thermal and electrical machines, and of systems powered by fossil fuels, nuclear fuel, and renewable sources for the production of heat and mechanical/electrical energy; • adequate language skills and the ability to formulate problems in mathematical terms; • analytical and synthetic skills, communication abilities, the capacity to convey knowledge, and a critical attitude.

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
3.1.3.6.0	Tecnici del risparmio energetico e delle energie rinnovabili
3.1.4.2.1	Tecnici della produzione di energia termica ed elettrica

Art. 2 - Admission requirements

To be admitted to this Bachelor's degree programme, applicants must hold a high school diploma (as required by current regulations) or an equivalent qualification obtained abroad, recognized as valid. Additionally, they must have or attain an appropriate level of initial background knowledge.

The number of admissible students is determined annually by the Governing Bodies of Politecnico based on locally programmed admissions, considering the available facilities and the student-to-faculty ratio.

The number of available places and admission procedures are specified in the official Call for applications for admissions published at https://www.polito.it/en/education/applying-studying-graduating/admissions-and-enrolment/bachelor-s-degree-programmes/calls-for-application-regulations-and-ranking-lists .

In particular, for enrolment in this Bachelor's degree programme, applicants must take an admission test (TIL-I), administered in different sessions according to a specific calendar published on the recruitment web pages.

The test is conducted using the technical equipment available in the computer laboratories of the University.

The minimum score required to be included in the ranking list is set at 30% of the total score. Applicants may take the TIL-I test up to a maximum of three times. In the event of multiple attempts, the highest score obtained by the applicant will be considered valid. The test consists of answering 42 questions in 1 hour and 30 minutes. These questions are divided into four sections covering four different subject areas: Mathematics, Reading Comprehension and Logical Reasoning, Physics, and Basic Technical Knowledge.

Applicants who score below 30% in the Mathematics section will have to fulfil some supplementary academic obligations (in Italian, Obblighi Formativi Aggiuntivi - OFA).

They will be invited to attend tutoring math classes during Year 1 and they must attend a supplementary course. This course, called C.I.A.O. - Corso Interattivo di Accompagnamento Online (Interactive Online Support Course), is normally offered in the week before the beginning of classes. It seeks to help applicants fill in the gaps in their Math knowledge through specific online tutoring sessions.

The OFA requirements will be considered fulfilled if, by the end of Year 1, at least one of the following conditions is met:

- students pass one of the two Mathematics exams of Year 1 (Mathematical Analysis I or Linear Algebra and Geometry);
- students pass the final test of the CIAO course by correctly answering at least 10 out of 15 questions. This test will be offered three times during the academic year.

Any exemptions from taking the admission test are specified in the Call for applications for admissions to the Bachelor's degree programmes of Politecnico di Torino.

Students with a non-Italian educational qualification who intend to enrol in the programme, which is delivered entirely in Italian, must hold, at the time of enrolment, a certificate of Italian language proficiency at level B2, as defined by the Common European Framework of Reference for Languages (CEFR).

For more information regarding the Call for applications, the number of admissions, the admission test registration and enrolment procedures, please visit https://www.polito.it/en/education/applying-studying-graduating/admissions-and-enrolment/bachelor-s-degree-programmes/calls-for-application-regulations-and-ranking-lists .

Art. 3 - Programme curriculum

3.1 Programme overview

The first year, common to all engineering programmes, focuses on foundational disciplines in mathematics, physics, chemistry, and computer science. It is also possible to complete this first year in English. Additionally, an early introduction to the science and technology of materials is provided, with particular attention to energy-related applications.

The second year offers extensive training in industrial engineering subjects, including technical drawing, electrical engineering and electrical machines, structural analysis, thermodynamics, and heat transfer. The year also includes the first core course of the programme, which deepens the study of thermofluid dynamics.

The third year has been redesigned in conjunction with the reorganization of the Master's Degree in Energy and Nuclear Engineering, the natural continuation of the Bachelor's degree. Two new courses have been introduced: *Power Generation Systems and Sustainability* and a *Computational Heat Exchange Laboratory*. These courses aim, respectively, to provide the skills to understand the engineering fundamentals of energy system operation and to equip students with the tools to independently implement computational models relevant to energy applications.

Additionally, three courses of equal credit value have been selected to introduce the main topics that will be fully developed in the three tracks of the Master's programme:

- *Energy and Renewable Sources*, presenting general aspects of the "Renewable Energy Systems" track;
- *Building Physics and Climate Control*, presenting key aspects of the "Design and Management of Energy Systems" track;
- *Elements of Nuclear Engineering*, introducing the "Sustainable Nuclear Energy" track.

The curriculum is completed with foundational courses in thermal machines and mechanical engineering.

A wide selection of elective courses offered by all engineering programmes allows students to further deepen their training. In particular, two modules have been specifically designed for Energy Engineering students: *Energy System Safety* and *Technologies for Sustainable Development*.

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=32&p_cds=553

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=32553&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 Bachelor's degree programme. The Student Guide is available on the web site of the degree programme.

It contains information and deadlines on:

- academic calendar;
- supplementary academic obligations (Obblighi Formativi Aggiuntivi - OFA);
- 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 an individual educational opportunity to complete the programme.
It requires the student to carry out an independent project, which consists of preparing a written report (Final Project) or a digital presentation of the results achieved.

Through the final project, the student demonstrates the ability to analyze and investigate a specific problem related to the courses attended, by studying the available documentation and performing basic technical and/or economic evaluations. The final project also provides an opportunity for the student to develop autonomy and demonstrate critical thinking and synthesis skills. The final project may optionally be written in English.

The final project consists of a written report containing an independent study conducted by the student on a topic proposed in the courses Energy System Safety or Technologies for Sustainable Development, or on a topic agreed upon with the instructor of one of the courses within the Degree Programme. The instructor responsible for the course corresponding to the topic of the final project supervises the student as a Tutor and, upon completion of the report, evaluates it by assigning one of the following scores: 1; 0.5; 0. The score awarded for the final project contributes to the determination of the final graduation grade.
The graduation ceremony, held in a public session, will take place according to the schedule established by the University.

Students must submit their request online through the dedicated procedure available in their personal page on the Teaching Portal, in the section "Degree and Final Examination", complying with the deadlines for the relevant session published in the Student Guide – Thematic Calendar section.

The final grade is determined by the Graduation Examining Committee, which evaluates the overall average grade of the exams on a scale of 110 after having subtracted the 16 worst credits. This number is proportionally reduced if some of the exams have been validated without a grade (pass-or-fail exams) or in the event of credit transfer, since only the exams taken at Politecnico are taken into consideration for this calculation.

To this average, the committee may normally add up to 5 additional points, based on:

- the evaluation of the Final Project;
- the number of years it took the student to complete his/her studies;
- the evaluation of the educational path partially or totally in English;
- other information about the student's course of study (for instance, the number of exams passed with honours, experience abroad, extracurricular activities etc.).

Students enrolled at Politecnico for the first time starting from a.y. 2022/2023 (and following aa.yy.) who pass their first-year courses and the core courses offered in Year 2 (Mathematical Analysis 2 and Physics 2) by the end of the examination session which immediately follows the semester of first course attendance will get a bonus (0.5 points for each exam) that will be added to the final grade, up to a maximum of 4 points.
Honours (cum laude) may be awarded upon achieving a score of 110, at the discretion of the committee and with a qualified majority, i.e., at least 2/3 of the committee members.

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.