UNIVERSITÀ DI TRENTO | Dipartimento di Fisica

Study Programme Master's Degree in Physics a.y. 2026/2027

Courtesy translation of the Manifesto degli study LM Fisica a.a. 2026/2027, approved by the Department's Board on April 22, 2026

This Study Programme specifies the provisions of the Teaching Regulation of the Master's Degree Programme in Physics for the Academic Year 2026/2027. Regulations and Programmes from previous academic years are available at https://corsi.unitn.it/it/fisica-magistrale/studiare/manifesti-e-documenti.

1. ACTIVATION

In the Academic Year 2026/2027, the Department of Physics activates the Master's Degree Programme in Physics, belonging to the Master's Degree class LM-17 R Physics, as per Ministerial Decree (DM) 1649 of December 19, 2023. The official language of the course is English.

2. EDUCATIONAL OBJECTIVES

The Master of Science in Physics aims at:

- providing deep and flexible training in the various areas of modern physics and its theoretical, experimental, and applicative aspects, with particular attention to recent developments of research and technology;
- providing the tools needed to master the scientific method, being involved in at least one advanced research area within those present in the Department, and contributing to its development with original inputs, through the thesis work.
- promoting scientific and technological innovation in the research areas of the Department of Physics, even through international collaborations.

In order to achieve these goals, the Master's Degree Programme devotes approximately one third of its ECTS to core courses in modern Physics, one third to more specialised courses in research areas that are actively investigated in the Department of Physics, and one third to the Master's thesis, carried out within a research group under the guidance of a supervisor.

3. ADMISSION REQUIREMENTS

In order to be admitted to the Master's Degree in Physics, students shall fulfil the following requirements:

- curricular requirements:
    a. Bachelor's Degree of at least three years, or equivalent;
    b. a total number of 84 CFU in Mathematics (identified in Italy with MATH*- or MAT/*) and Physics (identified in Italy with PHYS*- or FIS/*), of which at least 24 CFU in the area of Mathematics (MATH*- or MAT/*) and at least 54 ECTS in Physics (PHYS*- or FIS/*);
    c. knowledge of English at level B2, or more, within the Common European Framework of Reference for Languages (CEFR)
- adequate personal qualification.

Knowledge of the English language at the B2 level is considered to be verified through the submission of internationally recognized and valid language certificates, or through passing a B2-level examination at the student's home university. If the certificate is at a level higher than B2, the student will be granted recognition of the level indicated in the certificate, in accordance with the provisions established by the University Language Centre (CLA).

The adequacy of the applicant's personal preparation is assessed through an interview with a dedicated committee, the composition of which is detailed in point 7 below. The interview is

not an examination, but rather an opportunity for critical discussion aimed at identifying any gaps in the applicant's preparation and defining a path to address them. The interviews will be held between July and November 2026. Students may be exempted from the interview if they meet the following requirements:

a. at least 30 CFU in Mathematics (MATH-* or MAT/*);
b. at least 90 CFU in Physics (PHYS-* or FIS/*);
c. a Bachelor's degree with a final grade higher than 95/110.

4. PROGRAMME STRUCTURE AND STUDY PLAN

The academic calendar is published at http://offertaformativa.unitn.it/it/lm/fisica/studiare-e-frequentare and is structured in semesters. The workload required of students for each educational activity is measured in university credits (*crediti formativi universitari*, CFU) and equivalent to ECTS (European Credit Transfer and Accumulation System). One CFU corresponds to approximately 25 hours of total workload for the student, including those dedicated to individual study. The correspondence between teaching hours and CFUs is specified in the TeachingRegulation.

The Master's Degree in Physics provides a single educational path. Students are required to submit their study plan according to the deadlines indicated at https://offertaformativa.unitn.it/it/lm/fisica/studiare-e-frequentare. The study plan must comply with the current Degree Course Structure and Teaching Regulations and is approved by the Course Coordinator (*Referente del CdS*), who assesses its consistency with the Master's Degree educational objectives. Examples of study plans related to the Department of Physics research areas are updated and published yearly.

A course syllabus, containing educational objectives, detailed programs, and assessment methods, is available at https://unitn.coursecatalogue.cineca.it. The Department may not activate elective courses when the number of potential students is less than 3. Students interested in a course that is not activated will be informed promptly and advised on possible alternative choices.

4.a Core Courses (TAF B)

There are 2 mandatory Core Courses:

Year	Semester	Esse3 Code	Name	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	145164	Experimental Methods	56 (32 lesson + 24 exercise)	6	FIS/01	PHYS-01/A	Leonardo Ricci
1	I	146268	Advanced Quantum Mechanics	56 (32 lesson + 24 exercise)	6	FIS/02	PHYS-02/A	Alessandro Roggero

Besides these two mandatory core courses, students have to choose 5 options from the list below for a total number of 42 CFU. The choice must include:

- 1 course among the following:

Year	Semester	Esse3 Code	Name	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	145177	Statistical Mechanics	48	6	FIS/02	PHYS-04/A	Raffaello Potestio
1	I	146270	General Relativity	48	6	FIS/02	PHYS-02/A	Albino Perego
1	I	145646	Quantum Field Theory I	48	6	FIS/02	PHYS-02/A	Massimiliano Rinaldi
1	II	145649	Computational Physics	48	6	FIS/02	PHYS-02/A	Francesco Pederiva

- 3 courses among the following:

Year	Semester	Esse3 Code	Name	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	145511	Atomic Physics	48	6	FIS/03	PHYS-03/A	Gabriele Ferrari
1	I	145653	Solid State Physics I	48	6	FIS/03	PHYS-03/A	Giacomo Baldi
1	I	145854	Condensed Matter Theory	48	6	FIS/03	PHYS-04/A	Matteo Calandra Buonaura
1	II	145650	Physics of Disordered Systems	48	6	FIS/03	PHYS-03/A	Marco Zanatta
1	II	146269	Particle Physics	48	6	FIS/04	PHYS-01/A	Roberto Iuppa
2	I	145645	Nuclear and Subnuclear Physics	48	6	FIS/04	PHYS-02/A	Francesco Pederiva
2	I	145651	Quantum Theories for Multiparticle Systems	48	6	FIS/03	PHYS-04/A	Pier Luigi Cudazzo
2	I	146110	Antimatter Physics	48	6	FIS/03	PHYS-03/A	Sebastiano Mariazzi
2	I	146201	Physics and Chemistry of Semiconductor Materials	48	6	FIS/03	PHYS-03/A	Michele Orlandi
2	I	145775	Astroparticle Physics	48	6	FIS/04	PHYS-01/A	Paolo Zuccon

- 1 course not yet selected, among the list of Core courses

Year	Semester	Esse3 Code	Name	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	145177	Statistical Mechanics	48	6	FIS/02	PHYS-04/A	Raffaello Potestio
1	I	146270	General Relativity	48	6	FIS/02	PHYS-02/A	Albino Perego
1	I	145646	Quantum Field Theory I	48	6	FIS/02	PHYS-02/A	Massimiliano Rinaldi
1	I	145511	Atomic Physics	48	6	FIS/03	PHYS-03/A	Gabriele Ferrari
1	I	145653	Solid State Physics I	48	6	FIS/03	PHYS-03/A	Giacomo Baldi
1	I	145854	Condensed Matter Theory	48	6	FIS/03	PHYS-04/A	Matteo Calandra Buonaura
1	II	145648	Experimental Physics	60 (16 lesson + 44 laboratory)	6	FIS/01	PHYS-03/A	Riccardo Checchetto
1	II	145649	Computational Physics	48	6	FIS/02	PHYS-02/A	Francesco Pederiva
1	II	145650	Physics of Disordered Systems	48	6	FIS/03	PHYS-03/A	Marco Zanatta
1	II	146269	Particle Physics	48	6	FIS/04	PHYS-01/A	Roberto Iuppa
2	I	145645	Nuclear and Subnuclear Physics	48	6	FIS/04	PHYS-02/A	Francesco Pederiva
2	I	145651	Quantum Theories for Multiparticle Systems	48	6	FIS/03	PHYS-04/A	Pier Luigi Cudazzo
2	I	146110	Antimatter Physics	48	6	FIS/03	PHYS-03/A	Sebastiano Mariazzi
2	I	146201	Physics and Chemistry of Semiconductor Materials	48	6	FIS/03	PHYS-03/A	Michele Orlandi
2	I	145775	Astroparticle Physics	48	6	FIS/04	PHYS-01/A	Paolo Zuccon

4.b Elective integrative courses (TAF C)

In addition to core courses, students have to acquire at least 24 CFU through elective integrative courses in the following SSD: PHYS-* (FIS/*), MATH-03/B (MAT/06), MATH-04/A (MAT/07), CHEM-03/A (CHIM/03), CHEM-05/A (CHIM/06), BIOS-07/A (BIO/10).

Integrative courses for the Master's Degree in Physics are listed below. Furthermore, it is also possible to choose courses in different subjects, offered by the University of Trento's other master's programmes and declared as affiliated subjects. The study plan, including the chosen elective courses, will be subject to approval. Moreover, students can also take elective courses from core ones, which have not been selected among the required 5.

Year	Semester	Esse3 Code	Name	Details	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	140531	Introduction to Meteorology and Climatology	Offered by LM Environmental Meteorology	60	6	FIS/06	PHYS-05/B	Simona Bordoni
1	II	145171	Optoelectronics		48	6	FIS/01	PHYS-03/A	Lorenzo Pavesi
1	II	145347	Groups and Representations for Physics		48	6	FIS/02	PHYS-02/A	Mauro Spreafico
1	II	146271	Quantum Computing and Quantum Simulation		48	6	FIS/02	PHYS-02/A	Philipp H.J. Hauke
1	II	145175	Quantum Optics		48	6	FIS/03	PHYS-04/A	Docente da definire
1	II	145654	Solid State Physics II		48	6	FIS/03	PHYS-03/A	Roberto S. Brusa
1	II	145889	Multi-scale Methods in Soft Matter Physics	Blended Course	48	6	FIS/03	PHYS-04/A	Raffaello Potestio
1	II	146288	Quantum Gases		48	6	FIS/03	PHYS-03/A	Docente da definire
1	II	145882	Relativistic and Multimessenger Astrophysics		48	6	FIS/05	PHYS-05/A	Albino Perego
1	II	145338	Bio-Medical Imaging		48	6	FIS/07	PHYS-06/A	Albrecht Haase
1	II	145537	Physics Education: Theoretical and Experimental Approaches	Offered by LM Mathematics	56	6	FIS/08	PHYS-06/B	Pasquale Onorato
1	II	145907	Mathematical Physics - Quantum Relativistic Theories	Offered by LM Mathematics	63	9	MAT/07	MATH-04/A	Valter Moretti
1	II	146360	Superconducting Quantum Nanosystems, Circuits and Devices		48	6	FIS/03	PHYS-03/A	Docente da definire
1	II	140571	Atmospheric Boundary Layer and Turbulence	Offered by LM Environmental Meteorology	60	6	FIS/06	PHYS-05/B	Dino Zardi

1	II	140607	Introduction to Climate Change	Offered by LM Environmental Meteorology	60	6	FIS/06	PHYS-05/B	Dino Zardi
2	I	145282	Photonics		48	6	FIS/01	PHYS-03/A	Stefano Azzini
2	I	145231	Laboratory of Condensed Matter		56 (32 lesson + 24 laboratory)	6	FIS/01	PHYS-03/A	Marco Zanatta
2	I	145232	Laboratory of Energy Conversion Processes		56 (28 lesson + 28 laboratory)	6	FIS/01	PHYS-03/A	Luca Matteo Martini
2	I	145283	Laboratory of Advanced Photonics		56 laboratory	6	FIS/01	PHYS-03/A	Paolo Bettotti
2	I	145647	Quantum Field Theory II		48	6	FIS/02	PHYS-02/A	Docente da definire
2	I	146281	Laboratory of Optics for Quantum Sciences and Technologies		56 (16 lesson + 40 laboratory)	6	FIS/03	PHYS-03/A	Gabriele Ferrari e Matteo Leonardi
2	I	145546	Computational Biophysics	Offered by LM Quantitative and Computational Biology	96	12	FIS/02 FIS/03	PHYS-04/A	Gianluca Lattanzi Luca Tubiana
2	I	145892	Gravitational Wave Astronomy and Multimessenger Observations		48	6	FIS/05	PHYS-05/A	Giovanni Andrea Prodi
2	I	145230	Laboratory of Advanced Electronics		56 (24 lesson + 32 laboratory)	6	FIS/07	PHYS-06/A	Leonardo Ricci
2	I	145153	Experimental Physics Laboratory at High School Level I	Offered by LM Mathematics	56	6	FIS/08	PHYS-06/B	Pasquale Onorato
2	I	140534	Environmental Physical Chemistry	Offered by LM Environmental Meteorology	60	6	CHIM/03	CHEM-03/A	Daniela Ascenzi
2	I	146214	Markov Decision Processes and Reinforcement Learning	Offered by LM Mathematics	48	6	MAT/06	MATH-03/B	Luigi Amedeo Bianchi
2	I	146406	Quantum Information	Offered by LM Mathematics	63	9	MAT/06	MATH-03/B	Sonia Mazzucchi
2	II	145285	Statistical Field Theory		48	6	FIS/02	PHYS-04/A	Stefano Giorgini
2	II	146358	Laboratory of Nuclear and Subnuclear Physics		56 (24 lesson + 32 laboratory)	6	FIS/04	PHYS-01/A	Docente da definire
2	II	146364	Modern Cosmology		48	6	FIS/05	PHYS-05/A	Sunny Vagnozzi

2	II	145891	Medical Biophysics		48	6	FIS/07	PHYS-06/A	Francesco Tommasino
2	II	140575	Tropical Meteorology and Climate	Offered by LM Environmental Meteorology	60	6	FIS/06	PHYS-05/B	Simona Bordoni
2	II	145605	Renewable Energy and Meteorology	Offered by LM Ingegneria Energetica	60	6	FIS/06	PHYS-05/B	Lorenzo Giovannini
2	II	145734	Air pollution modelling	Offered by LM Environmental Meteorology	60	6	FIS/06	PHYS-05/B	Massimo Cassiani

4.c Elective free courses (TAF D)

The study plan is completed by 12 CFU without any disciplinary constraints. These free courses can be chosen from the University's educational offering and are subject to the approval of the study plan. However, it is recommended to take into account the suggestions relevant to the study plan for the research themes of interest.

Upon the student's request, these credits may be dedicated to coordinated educational activities carried out externally to the university within the framework of specific agreements and under the supervision of a professor from the Master's Degree Course. At the end of the activity, the professor will assign a grade out of thirty (with honors, if applicable), also based on a final report submitted by the student. These activities must be approved in advance by the competent teaching structure. For internship activities, please refer to the specific regulations available at the page https://www.physics.unitn.it/65/tirocini-e-periodi-di-ricerca-per-tesi.

TAF D courses offered by the Physics Department:

Year	Semester	Esse3 Code	Name	Details	Tuition Hours	CFU	SSD	SSD DM 639/2024	Lecturer
1	I	140732	Environmental fluid mechanics	Mutuato da LM Environmental Meteorology	60	6	GEO/12	GEOS-04/A	Marco Toffolon
1	II	146278	Quantum electromagnetics	Corso in modalità compatta	48	6	ING-INF/02	IINF-02/A	Paolo Rocca
1	II	146279	Numerical electromagnetics for Medical Diagnostic	Corso in modalità compatta	48	6	ING-INF/02	IINF-02/A	Andrea Massa

4.d Further language knowledge

3 CFU: foreign students have to acquire competencies in italian language:

140189 – Prova di conoscenza lingua italiana (A1)

Italian students have to acquire competencies in scientific English or in another language of the European Union:

145852 – Scientific Writing and Presentations in English (B2a)

145328 – Ulteriori conoscenze linguistiche (inglese C1)
145582 – Ulteriori conoscenze linguistiche (lingua tedesca B2)
145584 – Ulteriori conoscenze linguistiche (lingua spagnola B2)
145583 – Ulteriori conoscenze linguistiche (lingua francese B2)

4.e Health and safety training in the workplace

Students are required to comply with the rules regarding Health and Safety in workplaces available at https://www.unitn.it/it/studiare/iscrizioni/documenti-e-attestazioni/formazione-sicurezza-studenti-e-studentesse.

5. TUTORING AND MENTORING

To discuss difficulties related to the organization of the study plan, students can contact the Master's Degree Coordinator (Referente del CdS) in the indicated office hours. For difficulties related to the content of individual courses, professors are available for discussion in their indicated office hours.

6. FINAL EXAMINATION

The final exam consists of the preparation and discussion of a written thesis corresponding to 39 CFU. The Master thesis project will bring students into direct contact with at least one cutting-edge research topic in Physics, allowing them to contribute to its advancement. In general, the final exam aims at verifying the scientific maturity achieved by students at the end of their study career.

The research activity related to the Master's thesis is carried out under the supervision of one professor and/or researcher in a research Laboratory of the Department of Physics or in other research structures collaborating with the Department. A co-supervisor from any other public or private national or international research institution may be formally included.
Before starting the research activity, students need to be authorised to access the laboratories by sending the forms available at https://offertaformativa.unitn.it/en/lm/physics/graduation to the Secretariat.

The procedures for the final exam, the criteria for the final mark, further information on the Master's thesis and the evaluation committee for the final exam are available on the "*Regolamento per lo svolgimento della prova finale*" at https://offertaformativa.unitn.it/en/lm/physics/graduation.

The dates for the final examination sessions and the related deadlines are listed at https://corsi.unitn.it/it/fisica-magistrale/laurearsi/sessioni-di-laurea-e-scadenze.

7. CONTACTS

The control body of the Course is the Department's Board. The roles in charge of the management of the Course are:

- Prof. Albino Perego, coordinator for teaching activities of the Department and responsible for the definition of the Didactic offer;
- Prof. Marco Zanatta: coordinator for the Master's in Physics and responsible for study plan acceptance, students' career related issues, and organization of the final exams.

The Admission Committee for the Course is composed of Proff. Philipp H.J. Hauke e Michele Orlandi.

Furthermore, the following professors can be contacted for specific information on international mobility projects or internships:

- Prof. Philipp H.J. Hauke, Director's Delegate for the double degree with Eberhard-Karls-Universität Tübingen.
- Prof. Sebastiano Mariazzi, Director's Delegate for internships and placement.
- Prof. Massimiliano Rinaldi, Director's Delegate for international activities.

Any further information, not explicitly written in this document, can be found in Italian on the Manifesto 2026/2027 (this is only a courtesy translation) and the Regolamento del corso di laurea magistrale in Fisica, available at https://offertaformativa.unitn.it/en/lm/physics/rules-and-regulations