DESCRIPTION OF THE CURRICULUM
(TEACHING REGULATIONS OF THE COURSE)

BACHELOR'S DEGREE COURSE IN
PHYSICS (L-30R)

academic year 2025/26

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Art. 1 - General characteristics and organization

The Bachelor's Degree Course in Physics, class L-30R - Physical Sciences and Technologies - is activated according to the educational regulations of the academic year 2025/2026.

The course in brief

Interest, curiosity, and the desire to understand the laws governing natural phenomena—their simplicity and elegance—are the motivations for enrolling in the Physics degree program. A degree in Physics offers the possibility to directly impact society through the development of advanced technologies that originate today in fundamental research laboratories and may lead to innovative applications in the future. A physicist today is someone who actively contributes to society, often taking on leadership roles in public or private research institutions.

Due to the rapid evolution of technology, the job market continues to demand graduates with an open, versatile, and innovative mindset, with attention to detail and specific technical skills. The educational objectives of the Physics Degree Program foster this kind of mindset and prepare graduates to either pursue further studies in a specialized Master's program or to enter the professional world directly.

The degree program provides methodological, experimental, and theoretical foundations of both classical and modern physics, without requiring significant prerequisites. Students will delve into classical, relativistic, and quantum physics, addressing phenomenological and experimental aspects, theoretical perspectives, and their mathematical formalization.

By acquiring appropriate mathematical and computing tools, students will gain experience in the formulation and use of mathematical models and the application of computational techniques to solve physical problems, with accompanying laboratory activities at every step. The Bachelor's Degree in Physics opens the door to advanced studies at Master's level in Italy or abroad but also allows graduates to enter professions requiring experimental-applicative skills, knowledge of innovative methodologies, and the use of complex equipment. Learning outcomes are assessed through written and oral exams and lab activity reports.

The structure responsible for the course is the Department of Science and High Technology. The Program Coordinator is Prof. Alessia Allevi.

The Didactic Secretariat receives by appointment in via Valleggio 11 (4th floor) and replies to emails through INFOSTUDENTI. More information about this can be found at the following link: INFOSTUDENTI

Art. 2 - Teaching calendar of the course

Educational activities take place in Como. The internet address of the course is the following: https://www.uninsubria.it/formazione/offerta-formativa/corsi-di-laurea/fisica

The lesson calendar is published under the page **LESSON TIMETABLE:** https://www.uninsubria.it/formazione/offerta-formativa/corsi-di-laurea/fisica

The teaching calendar is divided into semesters:

I semester from **22 September 2025 to 16 January 2025**

II semester from **23 February 2026 to 12 June 2026**

Exams

There are at least 6 sessions for each course during the period of lessons suspension. The calendar of the exams is published on the page: https://uninsubria.esse3.cineca.it/ListaAppelliOfferta.do

Art. 3 - Education goals, expected learning outcomes and career opportunities

The Bachelor's Degree in Physics aims at providing a solid foundation in classical and modern physics, while also equipping students with the necessary mathematical, statistical, and computer science tools for formalizing physical laws. A graduate in Physics will be able to address problems requiring fundamental physics knowledge, develop mathematical models to describe physical processes, identify and use appropriate statistical and computational methods for data analysis, and perform laboratory measurements to quantitatively determine physical properties.

The educational activities of the Physics degree course are divided into three thematic areas.

BASIC TRAINING AREA

Knowledge and understanding

Students are expected to acquire 77 ECTS credits, mostly in the first two years. Courses in this area aim to build a strong scientific foundation on which more advanced skills can be developed.

Ability to apply knowledge and understanding

These courses provide essential mathematical and computer science tools needed for the formalization of physical laws and the analysis of experimental data.

MODELING AND METHODOLOGICAL TRAINING AREA

Knowledge and understanding

Students are expected to acquire 40 ECTS credits, primarily in the second year. This area introduces students to a higher level of abstraction through the use of advanced mathematical methods suitable for formulating the laws of quantum mechanics that govern atomic and subatomic physics.

Ability to apply knowledge and understanding

The skills acquired allow students to address problems related to research or applications in various fields of modern physics.

PHENOMENOLOGICAL AND EXPERIMENTAL TRAINING AREA

Knowledge and understanding

Students are expected to acquire 46 ECTS credits distributed throughout the three-year course. The combination of classroom and laboratory training is essential for giving physics education a unified dimension in which experimental evidence, phenomenological description, and mathematical formalization represent complementary aspects of the same discipline.

Ability to apply knowledge and understanding

The goal of this area is to ensure that students acquire the ability to experimentally verify the physical laws introduced in the basic training area, using programming and advanced analytical techniques, as well as typical research laboratory equipment.

JOB OPPORTUNITIES

Possible career paths include:

- Researcher in high-tech industries;
- Operator in scientific outreach and communication;
- Operator in mathematical/statistical modeling.

Additionally, the course provides the essential academic preparation to continue with a first-level Master's program or a Master's degree, particularly in Physics.

Art. 4 - Admission to the course

In accordance with current regulations, to access the degree course it is necessary to possess a high school diploma or an equivalent qualification obtained abroad and recognized as suitable.

The course has open enrollment (non-restricted admission)

Initial preparation verification methods

Although admission to the Bachelor's Degree in Physics is open, an initial knowledge assessment test is required. The course follows the national coordination of knowledge verification tests for scientific degree programs, organized by the National Conference of Presidents and Directors of University Science and Technology Departments (Con.Scienze), in collaboration with the National Scientific Degrees Plan of the MUR and CISIA.

- Students who have taken and passed the TOLC-S test of TOLC@Casa at the time of enrollment are admitted. The test is considered passed if the student answers at least 10 questions correctly in the Basic Mathematics module. The test can also be taken at a different university.
- Students who have taken but not passed the TOLC@Casa test are admitted but are assigned Additional Educational Obligations (OFA).
- Students who have not taken the TOLC@Casa test are also admitted but are assigned Additional Educational Obligations (OFA).

How to Fulfill the Additional Educational Obligations (OFA)

Students can fulfill the OFA in two ways:

- By taking and passing the TOLC@Casa test by the deadline of November 27, 2025. The test can be taken at another university.
- By attending the "Mathematics Tutoring" sessions and successfully completing the final test.

The mathematics tutoring:

- consists of 5 sessions, each 2 hours long, conducted by a subject-specific tutor;
- will be held in two editions: one between September and October, and another at the beginning of December;
- is considered attended if the student has participated in at least 4 out of 5 sessions;
- is considered passed if the student answers at least 10 questions correctly in the final test.

Consequences of Not Fulfilling the OFA

If none of the tests are passed, the OFA will be considered fulfilled if the student passes either the Calculus I or Linear Algebra exam by September 30 of the first academic year. Regular enrollment into the second year requires that the student has either taken the CISIA test at least once or attended one of the OFA remedial courses and passed the associated final test.

Preparatory training activities for the verification of the initial preparation

In the first half of September, math lessons will be provided. All information, including dates, will be published on the following website page:
https://www.uninsubria.it/formazione/consigli-e-risorse-utili/orientamento-e-placement/orientamento-prima-delliscrizione-9

Information on the Maths lessons for the Scientific Area are available at this link:
https://www.uninsubria.it/formazione/consigli-e-risorse-utili/orientamento/orientamento-ingresso/preparati-alluniversita-5

Exemptions

You do not need to take the test if:

- you are transferring from another degree program at the University of Insubria (internal transfer), provided you have taken and passed an initial assessment test similar to that required for your degree program
- you are transferring from another university where you have already taken and passed an initial assessment test similar to that required for your degree program
- you are enrolling with a degree that includes a mathematics exam in the curriculum
- you have already successfully taken a similar test at another university.

To obtain the exemption, students must send appropriate certification to the Student Office at the time of enrollment, confirming they passed the test (at least 10 correct answers in the Basic Mathematics module).

Art. 5 - Education Path

The program lasts 3 years and requires the acquisition of 180 ECTS credits (CFU), of which 12 are electives. There are no specific curricula tracks or internships.

Moreover, starting from the 2025/26 academic year, in collaboration with the Bachelor's program in Mathematics, a cross-disciplinary honors track (extra-curricular) will be introduced for students enrolled in the Physics Bachelor's degree, including short modules focusing on innovative topics aimed at engaging the most capable students.

Transversal skills such as communication and teamwork are developed through laboratory courses, where students are encouraged to collaborate and critically discuss their results. Additionally, the final exam consists of a thesis defense, which is intended to assess the student's ability to reorganize content and their clarity in presentation.

At the university level, since 2022, the **Teaching and Learning Center** has been active, periodically organizing activities aimed at developing soft skills and, in particular, transversal competencies and entrepreneurship. Participation and verification of skill acquisition result in the awarding of **Open Badges** that enhance the student's resume. These educational activities are offered as seminars and are open to

students from both undergraduate and graduate programs. Each seminar targets homogeneous student groups based on program type and level. These activities are generally unrelated to disciplinary content but contribute to students' overall education.

Teaching is delivered in a traditional (in-person) format.

In general, attendance is not mandatory, but consistent attendance, which allows for ongoing dialogue with instructors, is strongly recommended for full mastery of content and study methods.

For laboratory courses only, attendance of at least 75% of activities is mandatory. Special schedules are organized for working students.

Thanks to Ministerial Decree 752/2021, free tutoring hours are available for all students experiencing difficulties in organizing their studies and/or passing exams. Specifically, subject tutors and support tutors have been appointed for students with learning disabilities (DSA), disabilities, or those who are working.

CFU/hours correspondance for each type of activity

University Educational Credits (CFU) are a measurement of the amount of learning, including individual study, required to a student with an adequate initial preparation to acquire knowledge and skills in the educational activities required by the degree program.

Any educational activity (teaching, laboratory, internship, thesis, etc.) within the degree program corresponds to a specific number of educational credits (CFU).

Each CFU corresponds to 25 hours of commitment, given by the hours of lectures and laboratory and the ones of independent study necessary to complete the student's preparation.

The CFU number corresponding to each educational activity is acquired by the student upon passing the exam or any other form of assessment defined in the degree program rules.

Educational Activities / CFU:

- 8 hours of lectures with 17 hours of individual study;
- 12 hours of practical exercises with 13 hours of individual study;
- 11 hours of laboratory work with 14 hours of individual study
- 25 hours of activities related to the preparation of the final exam.

Lectures: This is the main and fundamental teaching activity; students attend lectures and independently process the content they have listened to.

Exercises: This activity allows to understand completely the content of lectures through the development of applications. No additional content is added to the lectures. Typically, exercises are associated with lectures and do not exist independently. In "passive" exercises, the application development is performed by the instructor; in active exercises, students develop applications under the instructor's supervision.

Laboratory: This is a supervised activity that involves the student interaction with tools, equipment, or application software packages.

Assessment Methods for Educational Activities

Assessment and evaluation methods are detailed in each course syllabus. Instructors decide on the types of assessments for their courses, which may include written exams, oral exams, lab reports, and project work. These may be mid-term or final exams. Some instructors offer ongoing assessments (in itinere) that may

reduce the weight of the final exam.

Students may register for exams via the ESSE3 platform starting one month before the exam date and up to five days prior. To register, students must have completed the course attendance requirement (where applicable).

Final exams (excluding mid-term assessments) take place during teaching breaks: typically mid-January to late February and mid-June to late September. Additional exam sessions may be introduced during other breaks upon decision of the Course Council (CCS).

Possible Prerequisites and/or Exclusions

There are no prerequisites.

Art. 6 - Rules for submitting study plans

Students are required to submit their Study Plan during the third year of the program, with the possibility of modifying it in subsequent years, in accordance with the annual deadlines published on the Student Services web pages: https://www.uninsubria.it/servizi/presentazione-piano-di-studio

Students must complete the study plan online by accessing their personal ESSE3 area, and must indicate:

- the elective course between *Physics Laboratory IIIA* and *Physics Laboratory IIIB*;
- the courses under the "electives" category (*TAF D*), for which 12 ECTS credits are reserved;

To assist with this choice, the Course Council includes, within the online study plan submission procedure, a list of recommended electives (TAF D) that are consistent with the educational path (see the next article).

Student Elective Courses (letter D)

As part of the "Student Elective Courses" program, students may choose, in their third year, from:

- courses offered in the Master's Degree in Physics;
- courses offered in other degree programs provided by the Department or University, provided they are consistent with the student's educational path and have been approved by the Course Council. In such cases, the study plan must be submitted in paper format, by requesting the form from the student office via the INFOSTUDENTI system;

Courses offered by limited access University degree programs cannot be chosen.

Additional Language Skills, IT and Interpersonal Skills, Internships, and More (Category F)

As part of the "Additional language skills, IT and interpersonal skills, internships, and more":

- In the first year, an English language course worth 3 CFU is included. These credits can be automatically recognized upon submission of a certificate attesting to B2-level English to the Student Office.
- As for IT skills, a Computer Laboratory course worth 6 CFU is included in the first year and requires mandatory attendance.
- In the third year, students may also select further computer science-related courses under the elective category.

Students can modify their elective choices from the third year onwards in future years, provided they are regularly enrolled.

Art. 7 - Opportunities offered during the training path

The program promotes several initiatives that complement and enrich the academic experience. In particular, it is possible to participate in mobility and internationalization programs:

- **Mobility abroad – Erasmus and other opportunities**
  https://www.uninsubria.it/internazionale/mobilita-allestero/programma-erasmus

Erasmus Code	University	Country	Maximum number of places	Maximum period (in months)
LT VILNIUS01	VILNIAUS UNIVERSITETAS	LITHUANIA	3	6
PL BYDGOSZ02	POLITECHNIKA BYDGOSKA IM JANA I JEDRZEJA SNIADECKICH	POLAND	1	6
RO TIMISOA01	UNIVERSITATEA DE VEST DIN TIMISOARA	ROMANIA	2	6
SI NOVA-GO01	UNIVERZA V NOVI GORICI	SLOVENIA	2	6
E VALENCI01	UNIVERSITAT DE VALENCIA	SPAIN	1	6
E CORDOBA01	UNIVERSITY CÒRDOBA	SPAIN	1	6
CH BERN01	UNIVERSITAT BERN	SWITZERLAND	2	12

- **Tutoring service** (https://www.uninsubria.it/servizi/tutti-i-servizi/tutorato)

  This service includes a variety of activities aimed at guiding, assisting, advising, and informing students. Alongside the general university tutoring service (informational), the degree program annually appoints disciplinary tutors - selected through a specific call - from among Master's or Ph.D. students in Physics or Astrophysics to support specific courses in the bachelor's program.

Contacting the "Diritto allo Studio" office, it is possible to apply for student collaborations: https://www.uninsubria.it/servizi/tutti-i-servizi/collaborazioni-studentesche-200-ore

Art. 8 - Graduation

The final examination consists of a short research project lasting approximately two weeks, on a topic selected by a committee from a set of three proposals submitted by the student's supervisor. The committee ensures that the complexity of the projects is comparable. The thesis is worth 3 cfu.

The thesis is presented and discussed before a degree committee composed of 5 faculty members, who evaluate the student's competencies in terms of understanding the problem, application of acquired knowledge, and clarity of presentation.

The final grade is calculated as follows:

- The weighted average of the grades obtained in all exams, scaled to a 110-point system;
- Additional points are assigned based on:
  - 0–3 points for the mastery of the thesis topic as demonstrated during the presentation and discussion;
  - 0–2 points for honors received in exams (1 point for each);

- A career bonus for graduating within the standard three-year timeframe:
  - 3 points for graduation by December,
  - 2 points by February,
  - 1 point by March;
- 1 additional point for participation in the Erasmus program.

If the total score is 110 or above, the committee may award honors (cum laude) unanimously.

Upon graduation, a **Diploma Supplement** is issued. The Diploma Supplement is an informative report accompanying the official qualification awarded at the end of the study program. It describes the nature, level, context, content, and status of the studies undertaken and completed by the student. It is issued in both Italian and English. The purpose of the document is to provide independent data for the international transparency of qualifications (diplomas, degrees, certificates, etc.) and to enable equitable academic and professional recognition, promoting student mobility. The Diploma Supplement complies with the Europass standard.

Appendix 1 - Study plan

FUNDAMENTAL COURSES

YEAR I							
SEM	**NAME**	**MODULE**	**SECTOR**	**TAF**	**CFU**	**HOURS**	**VERIFICATION METHODS***
I	CALCULUS I WITH EXERCISES		MAT/05	BASIC / MATHEMATICAL AND COMPUTER SCIENCE DISCIPLINES	9	LEZ: 56 ESE: 24	V
I	KINEMATICS AND POINT MECHANICS		FIS/02	BASIC / PHYSICAL DISCIPLINES	7	LEZ: 56	V
I	COMPUTER LAB		INF/01	OTHER / COMPUTER SKILLS	6	LAB: 66	V
I	PROBABILITY AND STATISTICS		FIS/01	CHARACTERIZING/EXPERIMENTAL APPLIED	7	LEZ: 56	V
II	SYSTEM MECHANICS AND THERMODYNAMICS		FIS/02	BASIC / PHYSICAL DISCIPLINES	9	LEZ: 72	V
II	LINEAR ALGEBRA WITH EXERCISES		MAT/03	RELATED/COMPLEMENTARY	8	LEZ: 56 ESE: 12	V
II	CHEMISTRY WITH EXERCISES		CHIM/03	RELATED/COMPLEMENTARY	2	ESE: 24	V
			CHIM/03	BASICS / CHEMICAL DISCIPLINES	6	LEZ: 48	
II	PHYSICS LABORATORY I		FIS/01	BASIC / PHYSICAL DISCIPLINES	6	LAB: 66	V
II	ENGLISH LANGUAGE		L-LIN/12	LANGUAGE/FINAL EXAM / FOR THE KNOWLEDGE OF AT LEAST ONE FOREIGN LANGUAGE	3	LEZ: 48	V
YEAR II							
SEM	**NAME**	**MODULE**	**SECTOR**	**TAF**	**CFU**	**HOURS**	**VERIFICATION METHODS***
I	CALCULUS II WITH EXERCISES		MAT/05	BASIC / MATHEMATICAL AND COMPUTER SCIENCE DISCIPLINES	8	LEZ: 56 ESE 24	V
I	OSCILLATIONS AND WAVES		FIS/02	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	9	LEZ: 72	V
I	ANALYTICAL MECHANICS WITH EXERCISES		MAT/07	RELATED/COMPLEMENTARY	8	LEZ: 48 ES: 24	V
I	ELECTROMAGNETISM	ELECTROSTATICS AND MAGNETOSTATICS	FIS/01	CHARACTERIZING/EXPERIMENTAL APPLIED	6	LEZ: 48	V
II		CLASSICAL ELECTRODYNAMICS AND SPECIAL RELATIVITY	FIS/01	CHARACTERIZING/EXPERIMENTAL APPLIED	8	LEZ: 64	V
II	QUANTUM PHYSICS I		FIS/03	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	8	LEZ: 64	V

II	PHYSICS LABORATORY II		FIS/03	CHARACTERIZING/EXPERIMENTAL APPLIED	6	LAB: 66	V
II	MATHEMATICAL METHODS FOR PHYSICS		FIS/02	CHARACTERIZING / THEORETICAL AND FUNDAMENTALS OF PHYSICS	11	LEZ: 88	V

YEAR III

SEM	NAME	MODULE	SECTOR	TAF	CFU	HOURS	VERIFICATION METHODS*
I	QUANTUM PHYSICS II		FIS/03	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	8	LEZ: 64	V
I	MATTER PHYSICS WITH EXERCISES	ATOMIC PHYSICS	FIS/03	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	5	LEZ: 40	V
II		MOLECULAR AND SOLID PHYSICS	FIS/03	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	5	LEZ: 40	V
II	NUCLEAR AND SUBNUCLEAR PHYSICS WITH EXERCISES		FIS/04	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	8	LEZ: 64	V
ND	ELECTIVE		NN	ELECTIVE	6		V
ND	ELECTIVE		NN	ELECTIVE	6		V
ND	FINAL EXAM		PROFIN_S	FINAL EXAM	3		V

YEAR III - ONE COURSE AMONG THE TWO LABORATORIES

SEM	NAME	MODULE	SECTOR	TAF	CFU	HOURS	VERIFICATION METHODS*
II	PHYSICS LABORATORY III A	SUBNUCLEAR PHYSICS LABORATORY	FIS/04	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	6	LAB: 66	V
I		MODERN PHYSICS LABORATORY	FIS/01	BASIC / PHYSICAL DISCIPLINES	6	LEZ: 66	V
II	PHYSICS LABORATORY III B	MATTER PHYSICS LABORATORY	FIS/03	CHARACTERIZING / MICROPHYSICS AND THE STRUCTURE OF MATTER	6	LAB: 66	V
I		MODERN PHYSICS LABORATORY	FIS/01	BASIC / PHYSICAL DISCIPLINES	6	LEZ: 66	V

G – JUDGEMENT V – EXAM I – SUITABILITY F – ATTENDANCE