



**CALL FOR APPLICATIONS FOR THE BACHELOR DEGREE IN NURSING -
L/SNT1 OF THE HEALTH PROFESSIONS
(IN ENGLISH)**

ACADEMIC YEAR 2026/2027

THE RECTOR

- GIVEN** the resolution n. 4/2026, of January 29, 2025 of the Board of Directors of the University of Palermo *"Proposal of the educational offer A. Y. 2026/2027"*;
- GIVEN** the Ministerial Decree n. 1003 of August 6, 2026, about *"Definition of the methods and contents of the admission tests for degree courses in healthcare professions in Italian and English A. Y. 2026/2027"*;
- GIVEN** the Ministerial Notice of July 3, 2026 concerning *"the Calendar tests of the admission tests to the 1st cycle Degree courses and single cycle degree courses with national access, A. Y. 2026/2027"*;
- GIVEN** the Educational Regulations of the University of Palermo as amended by Rector's Decree n. 3299/2025;
- GIVEN** Article 18, paragraph 3-ter of Legislative Decree no. 19 of 2 March 2024, coordinated with the conversion law no. 56 of 29 April 2024, containing: <<Further urgent provisions for the implementation of the National Recovery and Resilience Plan (PNRR)>>, which establishes the following: "In order to allow the prompt carrying out of the admission tests for university courses, in Article 4, paragraph 1, first sentence, of Law no. 264 of 2 August 1999, the word <<sixty>> is replaced by the following: <<thirty>>"
- GIVEN** the Ministerial Decree n. 1648 of December 19, 2023, about *"The defining the classes of 1st cycle degree courses"*;
- GIVEN** the Ministerial Decree n. 1649 of December 19, 2023, about *"The defining the classes of 2st cycle degree courses"*;
- GIVEN** the Ministerial Decree of October 22, 2004, n. 270 *"Amendments to the Regulation on the didactic autonomy of Universities"* approved by the Decree of the Minister of University and scientific and technological research of November 3, 1999, n. 509, as amended by Ministerial Decree no. 96 of 6 June 2023;
- GIVEN** the Law of August 2, 1999, n. 264 *"Rules for the access to University courses"* and subsequent amendments;
- GIVEN** the Decree of the President of the Italian Republic of December 28, 2000, n. 445, *"Consolidated Act of the regulations and legislative provisions regarding the administrative documents"*;
- GIVEN** the Law n. 241 of August 7, 1990, *"New rules for the administrative procedures and the right of access to the administrative documents"* and subsequent amendments and additions;

DECREES

Article 1 General Provisions

For the academic year 2026/2027, The University of Palermo announces a competitive selection for the three- year 1st cycle Degree Professional Qualification Course in **Nursing – in English language (code 2233)** of the School of Medicine and Surgery, class L/SNT-1 class of the Health Professions, for a number of:

- **36 (thirty-six) places (pending ministerial definition)**, intended for candidates from EU and non- EU countries residing in Italy pursuant to art. 39, paragraph 5 of Legislative Decree. 25 July 1998, n.286.
- **26 (twenty-six) places (pending ministerial definition)**, intended for candidates from non-EU countries residing abroad.

Article 2 Participation requirements

All the holders of an Italian High School diploma obtained in Italy or attending the fifth year of an Italian High School, who will achieve it by the end of the school year 2025/2026 and who have a knowledge of English language equivalent to **Level B2 of the “Common European framework of reference for languages” (CEFR)** may participate in the admission test.

EU candidates, wherever resident, and non-EU candidates legally residing in Italy, pursuant to art. 39, paragraph 5, of the Legislative Decree 25 July 1998, No. 286, as amended by art. 26 of the Law of July 30, 2002, No. 189, may participate if they hold a qualification obtained abroad (at least 12 school years) and recognized as equivalent to the Italian High School Diploma, or if they achieve it by the end of the School year 2025/2026.

All provisions regarding the access of foreign students can be found in the “**Ministerial regulations for the access of students to university courses for the 2026/2027 academic year**” to which reference is made in full, available in the website of the MUR (Ministry of University).

Candidates are also invited to read the information published on the institutional website:

<https://www.unipa.it/mobilita/en/new-students/new-students---enrolment/>

Article 3 Implementing Accessibility Tests- Disability and Neurodiversity

The competition test, referred to in this call, is organized by the University of Palermo taking into account the individual needs of candidates with disabilities pursuant to art. 16 of the Law no. 104/1992, as well as of candidates diagnosed with specific learning disorders (SLD) as per Law no. 170/2010. Candidates with a certificate of disability, with a certification referred to in Law n.104 of 1992, with a diagnosis of specific learning disorders (SLD) referred to Law n. 170/2010 or with a document certifying special educational needs (SEN) regarding other specific learning disorders, can benefit during the test from specific aids or compensatory measures, as well as of additional time, by making a specific request.

All necessary measures will be adopted in order to meet each candidates needs, taking into account also what follows.

The candidate must send the form, completed in its entirety and with all the documents required (otherwise he/she will be excluded from the requested benefits), to Ce.N.Dis, the Disability and Neurodiversity Office, through the following link:

<https://tiny.unipa.it/mvwQ0>

- compulsorily to August 24, 2026.

The adjustments will be granted only in the following cases:

- a) the candidate, with a disability certificate or with a certification pursuant to Law n. 104/1992, must provide the document attesting the types of disability and/or the degree of disability recognized, in order to allow an adequate organization of the requested service. Failure to send the above documentation will preclude the arrangement of the necessary aids required for the conduct of the tests. The candidate has the right to an additional time not exceeding 50% more than that foreseen for the performance of the test.
- b) The candidate with SLD as per Law n.170/2010 must promptly show the diagnosis certification issued by NHS or by organizations or by accredited professionals by their Regional Health Service, including a document issued by NHS. The diagnosis certification must have been issued to the candidate no more than 3 years ago or after the eighteenth year of life. Given the restrictions of NHS due to the COVID-19 emergency, the Scientific Council of Ce.N.Dis also considers the opportunity to admit the applications of candidates with SLD diagnosis according to the Law n.170/2010, based on documents issued to the candidate no more than 3 years ago or after the eighteenth year of life. In these cases the candidates must prove that they are awaiting the renewal or the certification of compliance by the NHS; the University reserves the right to request further documentations at a later time. Anyway the certifications issued by private specialists must be completed and drawn up according to all the requirements defined by the SLD Consensus Conference 2011. In accordance with the provisions of the "guidelines on specific learning disorders" attached to the Ministerial Decree July 12, 2011, protocol no. 5669, the candidates with SLD are granted an additional time equal to a maximum of 30% more than that foreseen for the admission test. In the case of particular certified severity of the SLD, the University may allow, in order to guarantee equal opportunities in the performance of the test, the use of the following compensatory tools: non-scientific calculator, video-enlarger or support of a reader chosen by the University with the support of special experts or of the Disability Office. In any case the following tools are not allowed: personal computer, tablet, smartphone and other similar tools.
- c) The candidates with special educational needs regarding other type of disability must provide the certification issued by NHS. Candidates with these disabilities are granted an additional time equal to a maximum of 30% more than that foreseen for the admission test, based on an assessment by the Scientific Council of Ce.N.Dis, who, moreover, may consider further compensatory aids according on the documentation provided. The documentation must be clear and completed with all the information about the candidates needs. Ce.N.Dis identifies the adjustment of the test which better fits to each candidate and notifies them by emails. Candidates with disability, SLD or special educational needs residing abroad, who intend to take advantage of the measures referred to in the above paragraphs, must submit the legalized certification proving the state of disability, SLD or special educational needs issued by the country of residence, equipped with a sworn translation of it in Italian or in English, true to the original text and a self-certification.

The Ce.N.Dis Scientific Council of the University of Palermo is the university body in charge for examining the certifications referred to in the above paragraphs, including the foreign documents attesting a condition of invalidity, disability, specific learning disorder or special educational needs recognized by Italian Law. For any requests of information and/or IT problems regarding the sending of the certification, it's available the following email:

cendis@unipa.it

Article 4 Applications

The application for the admission test, addressed to the Rector, must be made exclusively on line. To apply online, students must:

1. Enter the page <https://studenti.unipa.it> and register by clicking on the link:

- “Clicca qui per registrarti al **Portale Studenti UNIPA**”;
2. Log in the personal page on the **Portale Studenti UNIPA**;
 3. Select “Domanda di partecipazione a concorso per Corsi di Laurea a numero programmato” and fill the application form in every part;
 4. Pay the registration fee for the test **€ 60,00** (sixty/00). **In no case can the participation fee for the test be refunded. Online payment must be made without fail by 24 August 2026.**

Candidates are invited to carefully keep the receipt of payment of the participation fee for the competition and, if requested, to show it on the day of the test to the General Coordination Board or to the Classroom Manager.

According to the current legislation on privacy, each candidate will be identified by the **identification number** found on the **pagoPA** payment slip, therefore it will be his/her responsibility to keep this data to verify his/her position in the ranking lists.

In no case can the participation fee for the test be refunded.

The list of candidates who have applied for participation, will be published in the Official University Register and on the institutional website:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

The applications drawn up using forms or bulletins other than the official ones, submitted in different ways other than those described above or whose payment has been made after the deadline indicated, will not be taken into consideration.

The candidates, for any false declaration made in the self-certifications, will incur the penal sanctions provided for untruthful declarations, the formation or use of false documents, referred to in article 76 of Presidential Decree 28 December 2000 n. 445, as well as the forfeiture of the benefits consequent to the provision possibly issued on the basis of the untruthful declaration, if the verification carried out reveals the falsehood of any of the declarations made (art.75 President's Decree 28 December 2000, no. 445) and will be declared automatically forfeited from the right to enroll.

Applicants are obliged to view this announcement in its entirety; they are solely responsible for the correct indication of the data necessary for the admission procedures to the competitive selection; if winners, they also undertake to comply strictly with the content and procedures relating to the enrolment phase.

Article 5 Examining Board

The Board, with any Classroom Managers, will be appointed by Rector's Decree, at the proposal of the School of Medicine and Surgery; the composition of the Board will be published in the Official University Register and on the institutional website:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

Article 6 Admission test for the Nursing Degree Course in Health Professions

For the academic year 2026/2027, the admission to the Degree Course in Nursing - Nursing in English of the Health Professions to which are admitted the candidates from UE and non-UE countries as referred to in art. 39, paragraph 5 of the Legislative Decree July 25 1998, n. 286 and the candidates from non-EU countries residing abroad, is arranged by the University of Palermo and consists in the passing of a specific test regulated by the Ministerial Decree n. 1003/2026.

The admission test for the Nursing Degree in English language takes place on **September 17 2026 at 11:00 am**.

All candidates must appear at 8:00 a.m. on September 17, 2026, at Building 8 (Engineering), located in Viale delle Scienze Palermo, in the classrooms published on the institutional

website.

This notice has the value of an official convocation.

For organizational reasons related to the beginning of the test, if the candidates should show up after the distribution of the test, although arriving in time for the start of the test, they will not be admitted to the procedures for personal identification.

Candidates will be admitted to the competition after showing a valid personal identification document. If the candidate is not included in the list of those admitted to the test, a necessary condition for admission, with reserve, he/she will have to present the payment receipt. The room Commission will identify each candidate, by recording in appropriate registers the details of the identification document.

The candidates are forbidden to interact with each other during the test, to introduce and/or use in the classrooms mobile phones, handhelds, smartphones, smartwatches, tablets, earphones, webcam or other similar tools, to introduce and/or use pens, pencils, stationery (or any writing material) and/or introduce and/or use textbooks, school texts, personal notes as well as partial reproductions of them, handwritten notes, blank sheets and reference material. If a candidate is found to have any of the above items during the course of the test, he/she will be excluded from the test and expelled from the classroom.

Any bags, backpacks, books, etc., must be left outside the classroom in an area designated by the Committee, away from the computer stations. Safekeeping of these items is not guaranteed, and the Committee will not be responsible for any theft or loss.

The safekeeping of objects will not be guaranteed and the University will be not responsible for any possible theft or loss of them.

The admission test will consist in the solution of **sixty (60)** questions presenting **five (5)** answer options among which the candidate must identify only one, eliminating the wrong, arbitrary and less probable conclusions, on subjects as:

- Reading skills and knowledge acquired in studies;
- Logical reasoning and problem solving;
- Biology;
- Chemistry;
- Physics and Mathematics.

Based on the programs referred to in **Annex A** of this announcement, the questions will be distributed as follows:

- **four (4)** questions regarding the reading skills and knowledge acquired in studies;
- **five (5)** logical reasoning questions;
- **twentythree (23)** biology questions;
- **fifteen (15)** chemistry questions;
- **thirteen (13)** physics and mathematics questions.

The admission test for the Course in Nursing Degree in English language, will take place on **September 17, 2026**, at **11:00 a.m.** and it is scheduled a time of **100 minutes**.

The candidates who participate to this competition, will be considered eligible only if they achieve a score **higher than zero (0) points**.

Candidates who have not provided any answer to any question are not included in the ranking list.

A maximum of **ninety (90) points** are awarded for the evaluation of the test and the following criteria are considered:

- **1.5 points for each correct answer;**
- **minus 0.4 (-0.4) points for each wrong answer;**
- **0 points for each omitted answer.**

For the Bachelor Degree in “**Nursing**”, the University of Palermo, based on the score achieved according to the criteria shown in this article, will draw up two different ranking lists, one for EU and non-UE candidates, pursuant to art. 39, paragraph 5 of the Legislative Law July 25 1998 n. 286, and the other one for non-UE candidates residing abroad. In case of a tied score, the following criteria will be applied:

- a) the score obtained by the candidate in the solution, respectively, of the questions relating to the following topics prevails in decreasing order: biology, chemistry, physics and mathematics, logical reasoning, reading skills and knowledge acquired in studies;
- b) in case of a tied score between one or more disabled candidates in possession of a certificate of disability equal to or higher than 66% or disabled individuals with certification pursuant to law no. 104 of 1992 art. 3, paragraph 3 and one or more candidates not falling within the aforementioned categories, the disabled candidate(s) in possession of a certificate of invalidity equal to or higher than 66% or disabled individuals with certification pursuant to law no. 104 of 1992 art. 3, paragraph 3 will be preferred.
The disabled candidate in possession of a certificate of disability equal to or greater than 66% or the disabled candidate with certification pursuant to Law No. 104 of 1992, art. 3, paragraph 3, in possession of a medical certificate who intends, in the event of a tie with another candidate not falling within the aforementioned categories, to assert this preference is required to show to the University where he or she is "assigned" within the peremptory deadline of 15 (fifteen) days from the assignment, including the first day, the certificate of disability equal to or greater than 66% or the certification pursuant to Law No. 104 of 1992, art. 3, paragraph 3, under penalty of exclusion from the ranking.
- c) Except for the hypothesis referred to in point b) of this article, in case of further tied score, the youngest candidate prevails.

Candidates who have not paid the compulsory fee of € 60,00 will not be admitted to the selective test (art. 4 of the Rector Decree).

The participants are solely responsible for the correct indication of the data required for the admission procedures to the competition and are obliged to take note of this decree, available in the Official University Register and on this link:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

Article 7

Additional Educational Duties (OFA)

For the areas of knowledge “Biology” and “Chemistry” the General Coordination Board will not assign **Additional Educational Duties (OFA)** for candidates reaching a score equal to at least 50% of the maximum score for that area.

No Additional Educational Duties may be attributed for the areas: “Reading skills and knowledge acquired in studies”, “Logical reasoning and problem solving” and “Physics and Mathematics”.

Additional educational duties will be fulfilled by the students admitted to the Degree Course according to the indications provided by the Degree Course regulations and by the University.

Article 8

Ranking lists and scrolling lists

The ranking lists will be made available within the terms established by Law 264 of 2 August 1999, through publication in the Official University Register and on the institutional website:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

This publication has the value of notification.

Two ranking lists will be drawn up, one for EU and foreign candidates residing in Italy - as per art. 26 of the law n. 182/2002, and the other for foreign candidates residing abroad.

Candidates who, based on the ranking lists drawn up under the criteria specified in art. 6 will be included in the number of available places, must pay tuition fees as well as the all-inclusive registration fee **by 25 September 2026 through SPID procedure (Public Digital Identity System)**.

It is underlined that candidates are obliged to respect this enrolment date. No derogation can be granted in this regard.

Should any places remain available, the list of those entitled to enroll by scrolling of the ranking lists will be published **on 29 September 2026**, upon request of the Official in charge of the administrative procedure, in the Official University Register and on the institutional website:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

Enrolment must take place no later than **6 October 2026**, under penalty of forfeiture, according to the procedures described in art. 9.

The vacancies reserved for non-EU residents residing abroad will be reallocated to EU students.

Interested parties must submit an application for enrolment in accordance with the procedures set out in art. 9 within the days from the publication of the scrolling, under penalty of forfeiture.

After this date, should additional places remain available, the scrolling will be managed by the "Didactic Area and Student Services", by publishing the decision of the Official in charge of the administrative procedure, in the Official University Register and on the institutional website:

www.unipa.it/target/futuristudenti/accesso-programmato/corsi-accesso-programmato-nazionale/concorsi/

Article 9

Enrolment completion

The winners, included in the ranking list, are obliged to formalize their enrolment, paying the fees and submitting the application online through the **SPID** procedure, within the terms established by this announcement.

The winners with an active career will have to enroll in the academic year 2026/2027 and pay the "Change of course".

The students who have enrolled in the "Semestre Filtro/Aperto" program, if they should successfully placed in the merit rankings of the "Nursing" degree program 2026/2027 academic year, be able to enroll and their career will remain "suspended" until the publication of the rankings for admission to the "Second Semester" of the single-cycle degree courses in "Medicina e Chirurgia - MedIT – Odontoiatria e Protesi Dentaria – Medicina Veterinaria" 2026/2027 academic year.

The eligible students who fail to pay the registration fee will be considered as renouncers. To enroll at the University of Palermo you must:

- Obtain a valid (**University**) **ISEE** and/or a "ISEE parificato", in the case of non-EU candidates residing abroad;
- Access the "**Portale Studenti Unipa**" through the address <http://studenti.unipa.it> and log in through your credentials.
- Upload in the "**Portale Studenti Unipa**" a passport photo in jpg format with dimensions of 420x480pixels and with a weight of less than 200KB.
- Follow the instructions for the "**pratica di immatricolazione**" (enrolment procedure) at the end of which a pdf document will be produced.
- Make the due payments via the **pagoPA** system.
- Carry out the mandatory transmission of online documentation using the specific **Sistema Pubblico di Identità Digitale (SPID)** feature, available on the UNIPA Student Portal.

To "Change of course" you must:

- Access the "**Portale Studenti Unipa**" through the address <http://studenti.unipa.it> and log in through your credentials.
- Make the due payments about "Registration A.Y 2026/2027", via the **pagoPA** system about;
- Follow the instructions for the "**pratiche**" and "**Nuova Pratica**": "Passaggi ad altro Corso di Studio e Variazioni nella Carriera/ Domanda di passaggi ad altro corso di laurea

- o corso di laurea Magistrale”, following steps;
- Make the due payments via the **pagoPA** system.

Candidates who do not enrol through the payment of fees and taxes, and online delivery of the application for registration, within the deadlines, will be considered as renouncers, regardless of the reasons for the delay.

It is necessary to have a valid ISEE, relating to the services for the Right to University Education, when undertaking the enrolment procedure, and therefore, candidates are invited to request it, at a CAAF or other authorized parties, in good time. In any case, please refer to the Student Contribution Regulations, in force for the A.Y. 2026/2027.

Article 10

The Official in charge of the administrative procedure and final provisions

The Official in charge of the administrative procedure of this call is Dott. Maria Rita Placenti, Office Manager of the “U.O. Bandi e Concorsi”.

Candidates have the right to access to the proceedings of the competitive selection pursuant to Law 7 August 1990 n.241 and to the art.5 of the “Regulation on the right of documental access of the University of Palermo”. The requests must be submitted to the Public Relations Office site:

<https://www.unipa.it/URP-Ufficio-Relazioni-con-il-Pubblico/>

The application must be sent to the University Protocol Office email:

- or by pec@cert.unipa.it
- or by post to the address “Piazza Marina n.61-90133”.

PLEASE NOTE THAT THIS DECREE HAS THE VALUE OF AN OFFICIAL CONVOCATION: THE INTERESTED PARTIES WILL THEREFORE NOT RECEIVE ANY FURTHER COMMUNICATION.

For everything not expressly contemplated herein, the provisions of the law in force apply.

THE RECTOR
Prof. Massimo Midiri

Annex A

Programs regarding the questions of the admission tests for the Bachelor Degree in NURSING

A.Y. 2026/2027

For the admission to the courses, it is required the ability to understand and analyze written texts of various types, to conduct logical-mathematical reasoning, as well as a general knowledge, with a specific attention to the historical, geographical, social and institutional areas and disciplinary knowledge in mathematics, chemistry, physics and biology.

The required skills and knowledge refer to the preparation promoted by the educational institutions which arrange educational and didactic activities, in accordance with the National Guidelines for Secondary Schools and the Guidelines for technical and professional institutes, in particular in view of the High School Examination.

1. Reading skills and knowledge acquired in studies

The ability to understand written texts in the Italian language of different kind and with different communicative purposes constitutes a soft skill, given the fact that all types of questions will be formulated in Italian, even using symbolic language.

The following skills will be specifically tested:

- understanding abstract, uncommon or specialist vocabulary in real contexts;
- identifying the phenomena of textual cohesion and coherence;
- extracting and inferring specific information from the text.

These skills will be tested on short classical and contemporary scientific or narrative texts or from short news texts published in newspapers and general or specialized magazines.

Starting from short texts of various types and themes, the skills acquired in previous studies and the knowledge of general or of topics subject to contemporary public debate will be tested. In particular, the questions will aim to ascertain:

- the ability of orienting oneself in the space and time represented, or to place important historical-cultural events in space and time;
- the knowledge of the main national and international institutions;
- the understanding of legal, economic and citizenship matters.

2. Logical reasoning and problem solving

The questions aim at testing the ability to logically complete a reasoning, coherent with the premises. These are expressed in a symbolic or verbal form, focusing on cases or problems, even of abstract nature, whose solution requires the adoption of different forms of logical reasoning.

3. Biology

- The chemistry of the living.
- The biological importance of weak interactions.
- The organic molecules present in organisms and their respective functions. The role of enzymes.
- The cell as the basis of life. Cell theory. Cell size. The prokaryotic and eukaryotic animal and plant cell. The viruses.
- The cell membrane: structure and functions; transport across the membrane. Cellular structures and their specific functions.
 - Cell cycle and cell reproduction: mitosis and meiosis - chromosome kit and chromosomal maps.

- Reproduction and Inheritance. Life cycles. Sexual and asexual reproduction.
- Mendelian genetics: Mendel's laws and applications.

Classical genetics: chromosomal theory of inheritance - inheritance models. Molecular genetics: DNA structure and duplication, the genetic code, protein synthesis. The DNA of prokaryotes. The structure of the eukaryotic chromosome. Genes and regulation of gene expression.

Human genetics: transmission of mono- and multifactorial characters; autosomal and X-linked hereditary diseases.

- Mutations. Natural and artificial selection. Evolutionary theories. The genetic basis of evolution. Heredity and environment.
- Biotechnology: recombinant DNA technology and applications.
- Anatomy and Physiology of animals and humans. Animal tissues. Anatomy and physiology of human systems and apparatus and their interactions. Homeostasis.
- Bioenergetics. The energy value of cells: ATP. Redox reactions in living beings. Energy processes: photosynthesis, glycolysis, aerobic respiration, and fermentation.

4. Chemistry

- The constitution of matter: the states of aggregation of matter; heterogeneous systems and homogeneous systems; compounds and elements.
- Laws about perfect gases.
- The structure of the atom: elementary particles; atomic number and mass number, isotopes, electronic structure of the atoms of the various elements.
- The periodic system of elements: groups and periods; transition elements. Periodic properties of the elements: atomic ray, ionization potential, electronic affinity, metallic character. Relations among between electronic structure, position in the periodic system and element properties.
- The chemical bond: ionic bond, covalent and metallic bond. Bond energy. Polarity of bonds. Electronegativity. Intermolecular bonds.
- Fundamentals of inorganic chemistry: nomenclature and main properties of inorganic compounds: oxides, hydroxides, acids, salts.
- Chemical reactions and stoichiometry: atomic and molecular mass, Avogadro number, the concept of mole and its application, elementary stoichiometric calculations, balance of simple reactions, the different types of chemical reaction.
- The solutions: solvent properties of water, solubility, the main ways of expressing the concentration of the solutions.
- Balances in aqueous solution.
- Elements of chemical kinetics and catalysis
- Oxidation and reduction: oxidation number, concept of oxidant and reducing agent. Balancing simple reactions.
- Acids and bases: the concept of acid and base. Acidity, neutrality, and basicity of aqueous solutions. The pH. Hydrolysis. Buffer solutions
- Principles of organic chemistry: bonds between carbon atoms, raw and structure formulas, isomerism concept. Aliphatic, alicyclic, and aromatic hydrocarbons. Functional groups: alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides. Elements of nomenclature.

5. Mathematics

- Numerical sets and algebra: natural, integer, rational, real numbers. Sorting and comparison; order of magnitude and scientific notation. Operations and their properties. Proportions and percentages. Powers with integer, rational exponent, and their properties. Radicals and their properties. Logarithms (base 10 and base e) and their properties. Elements of combinatorial

calculus. Algebraic expressions, polynomials. Notable products, n-th power of a binomial, factorization of polynomials. Algebraic fractions. First and second-degree algebraic equations and inequalities. Systems of equations.

- Functions: fundamental notions about functions and their graphical representations (domain, codomain, study of the sign, continuity, maxima and minima, growth, and decrease, etc.). Elementary functions: integer and fractional algebraic, exponential, logarithmic, trigonometric functions. Compound functions and inverse functions. Trigonometric equations and inequalities.
- Geometry: polygons and their properties. Circumference and circle. Measures of lengths, surfaces, and volumes. Isometries, similarities, and equivalences in the plane. Geometric places. Measurement of angles in degrees and radians. Sine, cosine, tangent of an angle and their remarkable values. Trigonometric formulas. Resolution of triangles. Cartesian reference system in the plane. Distance of two points and midpoint of a segment. Straight line equation. Parallelism and perpendicularity conditions. Distance of a point from a straight line. Circumference, parabola, hyperbola, ellipse equations and their representation in the Cartesian Plane. Pythagorean Theorem. Euclid's Theorems (first and second).
- Probability and statistics: frequency distributions according to the type of character and main graphic representations. Concept of random experiment and event. Probability and frequency.

6. Physics

- Physical quantities and their measurement: Fundamental and derived physical quantities. Systems of measurement: International and Technical. Multiple and submultiples. Scientific notation. Main conversions among units of measurement of different systems. Scalar and vector quantities. Vectors and operations on vectors.
- Kinematics: Motion description. Velocity and angular velocity, acceleration, and centripetal acceleration. Uniform rectilinear motion, uniformly accelerated motion, uniform circular motion, harmonic motion.
- Dynamics: Concept of force as an interaction between bodies. Forces as applied vectors. The principle of inertia. Mass and the 2nd law of dynamics. Examples of forces: weight force, elastic force, static and dynamic friction. Action and reaction: the 3rd principle of dynamics. Pulse and momentum. Principle of conservation of momentum. Moment of a force and angular momentum. Work and kinetic energy. Conservative forces and potential energy. Principle of conservation of mechanical energy. Power.
- Mechanics of fluids: Fluid density and compressibility. Gases and liquids. Hydrostatics: pressure and principles of Pascal, Stevino and Archimede. Dynamics of liquids: one-dimensional motion, flow and flow rate, continuity equation. Ideal fluids and Bernoulli equation. Viscous forces in real fluids.
- Thermodynamics: Equilibrium, temperature concept, thermometers. Concept of heat and calorimetry. Modes of heat propagation. Thermal capacity and specific heat. Changes of state and latent heat. Laws of perfect gases. First and second law of thermodynamics.
- Electrostatics and electrodynamics: Electric charges. Forces between charges and Coulomb's law. Electric field and potential, equipotential surfaces. Dielectric constant, capacitance, capacitors. Electrostatic energy. Series and parallel of capacitors. Generators. Electric voltage. Electric current. Resistivity, resistance, resistors. Ohm's law. Series and parallel of resistors. Kirchhoff's principles. Work, Power, Joule Effect. Direct and alternating current. Period and frequency. Magnetic field of an electric current. Forces on electric currents in a magnetic field. Electromagnetic Induction.