



**CALL FOR APPLICATIONS FOR THE BACHELOR DEGREE
IN NURSING - L/SNT1 (IN ENGLISH)
ACADEMIC YEAR 2022/2023**

THE RECTOR

- 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;
- GIVEN** the Law n. 341 of November 19, 1990 “*Reform of University educational regulations*”;
- GIVEN** the Law by Decree of July 25, 1998, n. 286 “*Consolidated text of the provisions concerning immigration regulations and rules on the status of foreigners*”;
- 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 Legislative Decree of June 30, 2003, n. 196, “*Code about the protection of personal data*” and, in particular, art. 154, paragraphs 4 and 5;
- 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;
- GIVEN** the Ministerial Decrees issued on March 16, 2007, defining the classes of 1st and 2nd cycle degree courses, in accordance with the provisions of the aforementioned decree n. 270/2004;
- GIVEN** the Law of October 8, 2010, n. 170 “*Rules about specific learning disabilities in schools*”;
- GIVEN** the Educational Regulations of the University of Palermo as amended by Rector’s Decree n.341/2019;
- GIVEN** the resolution n. 170/2022, Prot. 15623/2022 of the Board of Directors of the University of Palermo “*Definition of the educational offer 2022/2023*”;
- GIVEN** the note of 04/03/2022 of the Ministry of University and research, concerning “*the communication of the dates of the admission tests for 1st cycle and 2nd cycle degree courses with national restricted access for the A.Y. 2022/2023*”;
- GIVEN** the Ministerial Decree of 24 June 2022 n. 583, concerning “*the methods and contents of the admission tests to the 1st cycle Degree courses and single cycle degree courses in Medicine and Surgery and Dentistry, A.Y. 2022/2023*”;
- GIVEN** the Ministerial Decree of 1 July 2022 n. 1113, concerning “*The number of available places for candidates from non-EU countries residing in Italy for the Degree Courses A.Y. 2022/2023*”;

GIVEN the Ministerial Decree of 1 July 2022 n. 1114, concerning “*The number of available places for candidates from non-EU countries residing abroad for access master's degree courses and single-cycle degree courses A.Y. 2022/2023*”;

DECREES

Article 1

General Provisions

For the academic year 2022/2023, The University of Palermo announces a competitive selection for the three-year 1st cycle Degree 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:

- **30 (thirty) places (pending ministerial definition)** places, 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.
- **20 (twenty) places** 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 2021/2022, 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 holding a qualification obtained abroad (at least 12 school years) and recognized as equivalent to the Italian High School Diploma, or achieving it by the end of the School year 2020/2021, by the end of the School year 2020/2021.

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 2022/2023 academic year” to which reference is made in full, available in the website of the MUR (Ministry of University): <http://www.studiare-in-italia.it/studenti stranieri> 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

Applications

The application for the admission test, addressed to the Rector, must be made exclusively online.

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 in the whole application form;
4. Pay the registration fee for the test - € 55,00 (fifty-five/00). **In no case can the participation fee for the test be refunded. Online payment must be made without fail by 24 August 2022.**

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.

By **September 2, 2022**, the list of candidates who have applied for participation, with the options indicated by them, will be published on the institutional website:

<http://www.unipa.it/provediammissione>

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

With respect to the self-certifications, candidates, in the case of false declarations, 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 enrol.

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; they also undertake, if winners, to scrupulously comply with the content and procedures relating to the enrolment phase.

Article 4

Procedure for the Disabled

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 n. 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 certification referred to in Law n.104 of 1992 or with a diagnosis of specific learning disorders (SLD) referred to in Law n.170 of 2010, can benefit, in carrying out the test, from specific aids or compensatory measures, as well as of additional time, by making a specific request.

The candidates referred to in paragraph above may be admitted to the test with the medical certification they possess, even if not updated, due to the limitation of the activity of the NHS for the COVID-19 emergency; however, the University of Palermo reserves the right to request subsequent integration of the documentation provided therein.

The University of Palermo will provide for the needs related to the request made, adopting all the necessary measures to meet the individual needs expressed by candidates, considering what is specified in the following points:

a) the candidate with a certificate of disability or with certification pursuant to Law 104 of 1992, must promptly present the part prepared for this purpose when completing the registration on the Student Portal of the University of Palermo, providing the certification - in original or certified copy without stamp duty - issued by the competent medical Board, proving the type of disability and/or the degree of disability recognized, to be sent exclusively to the email address of the Disability Office cud@unipa.it, without fail, by **24 August 2022**. 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 170 of 2010, must promptly fill in the specific part of the application at the time of completing the registration on the Student Portal of the University of Palermo, and provide the relative certification (Diagnosis of SLD in original or certified copy without stamp duty), to be sent exclusively to the email address of the Disability Office cud@unipa.it, without fail by **24 August 2022**. In compliance with the provisions of the “guidelines on specific learning disorders” attached to the Ministerial Decree July 12, 2011, protocol no. 5669, 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.

The diagnosis of SLD must have been issued to the candidate no more than 3 years ago, if prior to the age of eighteen, or after the eighteenth year of life and must have been issued by Local Public Health Facilities or by organizations and professionals accredited with the Regional Health Service. In any case, the following tools are not allowed: dictionary and/or vocabulary, formularies, periodic table of elements, concept map, *personal computer, tablet, smartphone* and other similar tools.

Candidates with handicap, disability or SLD residing abroad, who intend to take advantage of the measures referred to in the preceding paragraphs, must submit the legalized certification, where required by international standards in force, certifying the state of invalidity, disability or SLD issued in the country of residence, accompanied by a sworn translation by an official translator or certified in accordance with the original text by the Italian diplomatic missions, in Italian or in English.

The **Disability Office of the University of Palermo** is the University body in charge for examining the certifications referred to in the preceding paragraphs, including foreign documents certifying a condition of invalidity, disability or specific learning disorder recognized by Italian law.

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 on the web page:

<https://www.unipa.it/target/futuristudenti/iscriviti/corsi-accesso-programmato-nazionale/concorsi/>

Article 6

Competition procedure

The admission test to the three-year Degree Course in Nursing will be held at **13:00 on September 15, 2022**.

The venues for the test and the assignment of candidates to their respective venues and classrooms will be communicated through publication on the website:

<https://www.unipa.it/target/futuristudenti/iscriviti/corsi-accesso-programmato-nazionale/concorsi/>

Interested parties will not receive any further communication regarding the test venues.

All candidates will be required to show up at 9:30 on September 15, 2022, in the locations indicated for the identification procedures.

In consideration of the recent provisions on the containment and management of the epidemiological emergency from COVID-19, valid in the entire national territory, the University of Palermo will ensure, in the phase of access to the premises used for carrying out the tests as well as in the subsequent phases, the physical and social distancing among candidates themselves as well as the adoption, by the candidates and all the other subjects, of the personal and environmental hygiene measures pursuant to the emergency legislation.

This notice has the value of an official convocation, and the interested parties will not receive any further communication.

The admission test consists of the solution of **60 (sixty) questions in English with five (5) answer options** each, among which the candidate must identify only one, discarding the incorrect, arbitrary, or less probable conclusions, on topics of: reading skills and general knowledge, logical reasoning and problem solving, biology, chemistry; physics and mathematics. Based on the programs referred to in **Annex A**, the questions will be distributed as follows:

- **four (4)** questions related to 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.

Admission test will start at 13.00 and a time of 100 minutes is provided for the admission test. Candidates may be admitted to the admission test upon presentation of a valid personal identity document. If the candidate does not appear on the list of those admitted to the test, a necessary condition for conditional admission is the presentation of the payment receipt for participating in the competitive selection.

Each classroom Board will carry out the personal identification of each candidate by recording the details of the identification document on paper records.

Candidates are prohibited from introducing *mobile phones, palmtops, smartphones, smartwatches, tablets, earphones, webcams* or other similar equipment, manuals, school textbooks and/or partial reproductions of them, handwritten notes and reference material into the classroom. The candidate who is found in possession of any of the above objects during the test will be excluded from the test and expelled from the classroom.

Any bags, backpacks, books, etc. must be left outside the classroom. The custody of the objects will not be guaranteed, and we will not be held responsible for any theft or loss of the same.

At the time of the test, candidates will be provided with:

- A general instruction sheet
- The registry card
- An envelope
- A marker
- The answer sheet
- A pair of adhesive bar codes

- The sealed questionnaire

Since, for the security, confidentiality and transparency of the operations, the test is printed in several versions differing from one another in the order of the questions and respective answers, candidates are recommended to insert in the lower part of the answer sheet **the letter corresponding to the assigned questionnaire.**

In the absence of this indication, being unable to attribute the answers given to the assigned questionnaire, a total score of zero will be given.

The test will be voided if the name is placed on the card or if other signs of possible identification are found.

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.**

Candidates are only eligible if they have achieved a score greater than **zero (0) points**. Candidates who have not provided any answer to any question are not included in the ranking list.

In the event of a tie, the following criteria apply:

- 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, reading skills and knowledge acquired in studies;
- b) in the event of a tie between one or more disabled candidates in possession of a certificate of disability equal to or greater 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 greater 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 medical certification, even if not updated due to the limitation of the activity of the NHS for the COVID-19 emergency, which intends, in the event of a tie with another candidate not falling within the aforementioned categories, to enforce this preference right is required to show to the University within the peremptory time limit of 15 (fifteen) days the certificate of disability equal to or greater than 66% or the certification referred to in law no. 104 of 1992 art. 3, paragraph 3 under penalty of exclusion from the ranking; after this deadline has elapsed, the undocumented title of preference cannot be taken into consideration;
- c) apart from the hypothesis referred to in the previous letter (letter b), in the event of further equality, the younger candidate prevails.

Based on the overall score, two ranking lists will be drawn up, one for EU and foreign candidates residing in Italy, pursuant to art. 26 of the law n. 189/2002, and the other for foreign candidates residing abroad.

The condition of eligibility for admission to the degree course in “Nursing” refers only to the selective procedure in place.

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 on the website

<http://www.unipa.it/graduatorie>

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 22 September 2022 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 enrol by scrolling of the ranking lists will be published **on 27 September 2022**, upon request of the Official in charge of the administrative procedure, on the page:

<http://www.unipa.it/scorrimenti>

Enrolment must take place no later than **4 October 2022**, under penalty of forfeiture, according to the procedures described in art. 9.

Should additional places remain available, the list of those entitled to enrol by scrolling will be published on **7 October 2022**, upon request of the Official in charge of the administrative procedure, on the page:

<http://www.unipa.it/scorrimenti>

Enrolment must take place no later than **12 October 2022**, under penalty of forfeiture, according to the provisions of art. 9.

Should additional places remain available, the list of those entitled to enroll by scrolling will be published on **14 October 2022**, upon request of the Official in charge of the administrative procedure, on the page:

<http://www.unipa.it/scorrimenti>

Enrolment must take place no later than **18 October 2022**, under penalty of forfeiture, according to the procedures of art. 9.

The vacant places 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 Administrative Secretariat of the Special Service for Teaching and Students, by publishing the decision of the Official in charge of the administrative procedure, on the page:

<http://www.unipa.it/scorrimenti>

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 and in the manner described at the web address:

<http://www.unipa.it/accessoprogrammato>

To enrol 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 420x480 pixels 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.

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 to have renounced, 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. 2022/23.

Article 10

Final provisions

The Official in charge of the administrative procedure, according to the provisions of art. 4 of the law n. 24 of 7 August 1990, is Dott. Massimo Albeggiani, Coordinator of the “Servizio Speciale per la Didattica e gli Studenti - Segreteria Studenti”.

Candidates have the right to access to the proceedings of the competitive selection according to the procedures provided for by the regulations (D.R. 664 of 09 February 2004), pursuant to Law 7 August 1990 n. 241 and to the Presidential Decree 352/92. The requests must be submitted to the Public

Relations Office of the Central Administration of the University of Palermo - email urp@unipa.it, telephone number 091/23893666.

As regards the provisions about the protection of personal data, please refer to Legislative Decree 196/2003 of 30 June 2003.

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

For anything not expressly contemplated in this announcement, the provisions of the law in force apply.

THE RECTOR
Massimo Midiri

Annex A
Three-year Degree Course in Nursing
Programs of the admission test A.Y. 2022/2023

Admission to the courses requires the ability to understand and to analyse written texts of various kinds, the attitude to logical-mathematical reasoning, as well as general knowledge, with respect, in particular, to the historical, the geographical, the social and institutional sphere, as well as to mathematics, chemistry, physics, and biology.

The required knowledge and skills refer in any case to the preparation provided by the educational institutions offering educational activities consistent with the national indications for high schools and with the guidelines for technical and professional institutes, for the High School Diploma examinations.

1. Reading skills and knowledge acquired in studies

Ability to understand texts written of different kind and with different communicative purposes constitutes a cross skill, given 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 by, 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 culture or of topics subject to contemporary public debate will be tested. In particular, the questions will aim to ascertain:

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

2. Logical reasoning and problem solving

The questions aim at testing the ability to logically complete a reasoning, in a consistently with the premises, which are expressed in symbolic or verbal form, and focus on cases or problems, even of an 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 their 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 its 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.