For admission to the courses, the following skills are required: the ability to understand and analyze written texts of various types, to conduct logical-mathematical reasoning, as well as knowledge of general culture, with a special focus on historical, geographical, social, institutional, and disciplinary aspects in mathematics, chemistry, physics, and biology.

The required skills and knowledge correspond to the preparation promoted by educational institutions that organize educational and didactic activities consistent with the National Guidelines for high schools and the Guidelines for technical and vocational institutes, especially in view of the State Examinations.

1. Reading Skills and Knowledge Acquired in Studies

The ability to comprehend written texts in the English language of different nature and with different communicative purposes constitutes a cross-cutting skill since all types of questions will be formulated in English, even using symbolic language. The following skills will also be specifically verified:

- Comprehending abstract, uncommon, or specialist vocabulary in real contexts.
- Identifying textual cohesion and coherence phenomena.
- Extracting and inferring specific information from the text.

These skills will be assessed based on short texts of scientific essays or classic and contemporary fiction, or short texts of current affairs published in newspapers and general or specialized magazines.

Starting from short texts of various types and themes, the test will also assess the competencies acquired in previous studies and knowledge of general culture, including topics of supranational scope or subjects of contemporary public debate. In particular, the questions will aim to ascertain:

- The ability to orient oneself in represented space and time, i.e., to place historically and culturally relevant phenomena in space and time.
- Knowledge of the main national and international institutions.
- Comprehension of phenomena related to legal, economic, and citizenship fields.

2. Logical Reasoning and Problem Solving

The questions are designed to assess the ability to logically complete a reasoning process coherently with the premises. These premises are stated in symbolic or verbal form and focus on cases or problems, including abstract ones, whose solution requires adopting different forms of logical reasoning.

3. Biology

- Chemistry of living organisms.
- The biological importance of weak interactions.
- Organic molecules present in organisms and their functions. The role of enzymes.

The cell membrane: structure and functions; transport through the membrane. Cellular structures and their specific functions.

Cell cycle and cell reproduction: mitosis and meiosis - chromosomal complement and chromosomal maps.


Mendelian genetics: Mendel's laws and their applications.


Human genetics: transmission of mono- and polygenic traits; autosomal and X-linked hereditary diseases.


Biotechnologies: recombinant DNA technology and its applications.


4. Chemistry

The composition of matter: states of matter; heterogeneous and homogeneous systems; compounds and elements.

Ideal gas laws.

Atomic structure: elementary particles; atomic number and mass number, isotopes, electronic structure of atoms of various elements.

The periodic table of elements: groups and periods; transition elements. Periodic properties of elements: atomic radius, ionization potential, electron affinity, metallic character. Relationships between electronic structure, position in the periodic table, and properties of elements.


Fundamentals of inorganic chemistry: nomenclature and main properties of inorganic compounds: oxides, hydroxides, acids, salts.

Chemical reactions and stoichiometry: atomic and molecular mass, Avogadro's number, concept of mole and its application, elementary stoichiometric calculations, balancing simple reactions, different types of chemical reactions.

Solutions: solvent properties of water, solubility, major methods of expressing solution concentration.

Equilibria in aqueous solution.

Elements of chemical kinetics and catalysis.

Oxidation and reduction: oxidation number, concept of oxidizing and reducing agents, balancing simple redox reactions.


5. Mathematics

- Numeric sets and algebra: natural, integers, rationals, and real numbers. Ordering and comparison; orders of magnitude and scientific notation. Operations and their properties.
- Proportions and percentages. Powers with integer and rational exponents and their properties. Radicals and their properties. Logarithms (base 10 and base e) and their properties.
- Functions: fundamental concepts about functions and their graphical representations (domain, codomain, sign study, continuity, maxima, minima, growth, and decline, etc.). Elementary functions: algebraic (integer and fractional), exponential, logarithmic, trigonometric. Composite functions and inverse functions. Trigonometric equations and inequalities.

- Pythagoras's theorem. Euclidean theorems (first and second).

6. Physics

- Scalar and vector quantities. Vectors and vector operations.
- Kinematics: Description of motion. Velocity and angular velocity, acceleration and centripetal acceleration. Uniform rectilinear motion, uniformly accelerated motion, uniform circular motion, harmonic motion.