

Topics of the Mathematics entrance test

- Number theory. Integers, divisibility, prime numbers. Greatest common divisor, least common multiple.
- Real numbers. Rational and irrational numbers. Operations on real numbers. Powers, radicals, and logarithms. Absolute value. Percentages. Equations, simultaneous equations, and inequalities. The quadratic formula. The arithmetic mean of real numbers, the geometric mean of positive real numbers.
- Geometry. Polygons. Triangles, quadrilaterals. The circle. Areas of plane figures. Degrees and radians. Spatial geometry, solids, prisms, pyramids, cylinders, cones. The sphere. Surface area and volume of solids.
- Trigonometry. Trigonometry in right-angled triangles. The cosine and sine rules. Addition formulae.
- Functions. Real functions. The linear and quadratic functions. The inverse proportionality function. The absolute value function. Exponential and logarithm functions. Trigonometric functions. Domains and images of functions. The graph of a function. Linear transformations of the dependent and the independent variable.
- Vectors. Operations on vectors: addition, subtraction, scalar product. Vectors in the Cartesian plane, coordinates. Equations of straight lines, parabolas, and circles in the Cartesian plane.
- Sequences. The arithmetic and the geometric progressions.
- Algebraic expressions. Polynomials, rational fractions.

Topics of the Physics entrance test

- Kinematics (moving on straight lines, projectile motions, circle motion)
- Dynamics (dynamics of a single mechanical particle, dynamics of particle systems)
- Statics of mechanical particles (mechanical particles in rest, laws of rest)
- Fluid dynamics (dynamics of not flowing fluids, Pascal's law, Archimedes' law, buoyancy forces)
- Electricity (simple DC electric circuits, describing laws of simple DC electric circuits, main elements of electric circuits)
- Thermodynamics I. (gas laws, thermodynamic processes of gases)
- Thermodynamics II. (heat transfer, heat conduction)
- Optics (light as electromagnetic wave)
- Elements for quantum optics (duality of the light)
- Elements of atomic physics (base of atomic nuclei, electrons, protons)