Topics for the entrance exam in mathematics for foreigners to the Cracow University of Technology for the academic year 2025/26.

- 1. Real numbers: arithmetic operations (addition, subtraction, multiplication, division, multiplication, rooting, logarithm); divisibility of integers; number interval; absolute value; percentages.
- 2. Algebraic expressions: short multiplication formulas; addition, subtraction, multiplication and division of polynomials and rational expressions.
- 3. Equations and inequalities: linear, quadratic and exponential equations and inequalities; polynomial, rational and logarithmic equations.
- 4. Systems of equations: Systems of linear equations and their geometric interpretation; systems of equations, one of which is linear and the other quadratic.
- 5. Functions: domain, set of values, graph, 0's of functions, monotonicity range, largest and smallest value; functions: linear, quadratic, exponential, logarithmic and $f(x) = \frac{a}{x}$; transforming graphs of functions (shift by a vector, symmetry with respect to Ox and Oy axes).
- 6. Sequences: monotonicity of a sequence; arithmetic and geometric sequence (formulas for the nth term of a sequence and for the sum of n initial terms of a sequence).
- 7. Trigonometry: use of sine, cosine, tangent functions and formulas $sin^2x + cos^2x = 1$, $tg x = \frac{\sin x}{\cos x}$.
- 8. Planimetry: circle, circle section, arc length of circle, inscribed angle and central angle; polygons their areas and perimeters; use of theorems: Pythagoras, Tales, sines, cosines; similarity and congruence of figures; inscribed and circumscribed circle on a triangle.
- 9. Analytical geometry: equations of lines, their perpendicularity and parallelism; distance of two points in the plane; distance of a point from a line; equation of a circle.
- 10. Stereometry: the angle between a line and a plane, the dihedral angle, the crosssection of a cuboid by a plane; the angle of dilation of a cone, the angle between the cone's origin and base; areas and volumes: prisms, pyramids, cylinder, cone and sphere.
- 11. Combinatorics, probability calculus and statistics: apply simple combinatorial formulas (permutations, combinations, variations with and without replacement); classical probability; arithmetic mean, weighted mean, median, dominant, expected value and standard deviation.

Candidates are bound by the above topics and their applications in practical problems.