

# UNIVERSITY PREPARATORY PROGRAMME

## MATHEMATICS - SYLLABUS

- Number fields: natural numbers, integers, rational numbers, real numbers. Work with fractions.
- Algebraic expressions: powers, roots and their manipulations.
- Logarithms, exponentials. absolute value. Domain of definition.
- Linear and quadratic functions; Equations, equations with parameter. Inequalities: linear, quadratic, with power or square root, with absolute values. Inequalities in product form.
- Goniometric functions. Equations, inequalities.
- Sequences and series: arithmetic sequence, geometric sequence, sum of a geometric series, sum of the first n terms of an arithmetic or geometric series.
- Combinatorics: permutations, combinations and combinations with repetition, binomial theorem in problem solving,
- Probability, statistics: probability of random phenomena, independence of phenomena, conditional probability.
- Complex numbers, notation in another number system.
- Systems of equations and inequalities. Equations: with percentages, with square roots, goniometric, with absolute values. Linear and quadratic.
- Analytic geometry: point and vector coordinates, line in plane (general equation, parametric form), angle and scalar product, vector product, planes and half-planes, conics.
- Statement logic: conjunction, disjunction, implication, equivalence, negation.

These topics should cover all problems from the most difficult entrance tests to CTU (namely FIT).

We are trying to adjust topics and exercises to the skills and interest of present students. In the case of their interest the teacher can prepare or change almost any topic (from high school math).

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*Please take note that this document has just an informative character and the list of the topics can be changed in the course of the programme.*