



# Exam 1 : Mathematics

## Syllabus for the Admission Examination to “Politehnica” University of Timisoara

### Subject: Mathematics

#### Faculty of Automation and Computers

- **Bachelor’s Programmes : Computers and Information Technology**
  - Bachelor Level I, years of study: 4 – Romanian-medium programmes and English-medium programmes
- **Bachelor’s Programmes: Systems Engineering**
  - Bachelor Level I, years of study: 4 – Romanian-medium programmes

#### Faculty of Electronics and Telecommunications

- **Bachelor’s Programmes: Electronics and Telecommunications Engineering**
  - Bachelor Level I, years of study: 4 – Romanian-medium programmes and English-medium programmes

### Syllabus

#### Elements of algebra

Arithmetical and geometrical progressions

Functions: integer part function, square root function, quadratic function, Exponential and Logarithmic functions, Irrational equations, Exponential and logarithmic equations.

Systems of non-linear equations, Permutations, arrangements, combinations, Newton’s binomial.

Complex numbers in the algebraic form. Complex numbers in the geometric form.

Matrices, determinants, systems of linear equations.

Composition laws. Groups. Rings and fields. Polynomial rings with coefficients in a commutative field.

#### Elements of geometry and trigonometry

Plane vectors. Trigonometric functions. Relations between trigonometric functions. Trigonometric equations. Scalar product .

Trigonometric applications in plane geometry : cosine law, sine rule, solution of triangles. Equations of a straight line in plane geometry. Parallelism and perpendicularity of two straight lines. Calculus of distances and areas. Circles, ellipses, hyperbolas , parabolas and their graphic representations.

#### Elements of Mathematical Analysis

Limits of sequences. Limits of functions. Continuity. Differentiability. Applications of derivatives for the study of the variation of functions. Primitives. Definite integral. Applications of definite integral: area of a plane surface, volume of rotation bodies, calculus the limit of a sum using definite integrals.

### Bibliography:

1. Alternative handbooks approved by the Romanian Ministry of Education for IX-th, X-th, XI-th, XII-th grade;
2. T. Banzaru, N. Boja, O. Lipovan, A. Kovacs, Gh. Babescu, P. Gavruta, D. Rendi, I. Mihut, D. Daianu, D. Paunescu, C. Milici, R. Anghelescu - *Mathematical tests (with choose option response) for the high school graduated and the university admission examinations*, Ed. Politehnica, Timisoara, 2007 or 2010.

*Note* : The selected exam subjects will contain problems as those contained in bibliography sources.