Courses available for incoming Erasmus students

No.	Subject	ECTS	Description	Remarks
1.	**Complex Analysis**	**4**	The aim of the course is to familiarize students with the basic terminology and methods used in complex analysis.The main topics are: holomorphic function and analytic function, integral of complex function, integral theorems, singular points, theorem on residues and its applications.	Master's degree studies
2.	**Discrete Mathematics**	**2**	The aim of this course is to acquaint students with combinatorial objects, methods of counting them and their applications in solving discrete optimization problems.	Bachelor's degree studies
3.	**Differential Equations**	**5**	The main aim of this course is to acquaint students with basic methods of solving of ordinary differential equations and linear systems of ordinary differential equations.	Bachelor's degree studies
4.	**Functional Analysis**	**5**	The aim of the course is to acquaint students with the basic concepts of functional analysis such as the notion of the Banach space and their basic examples. Moreover, students learn about convergence in Banach spaces, norm of continuous linear operator, Hilbert spaces, minimum Fourier coefficients property, theorems concerning the form of linear functionals in selected Banach spaces, norms in dual spaces, Hahn-Banach theorem.	Master's degree studies
5.	**General Algebra and Number Theory**	**5**	The main aim of the course is to teach students the basic notions and theorems from number theory, group theory, rings and fields.	Bachelor's degree studies
6.	**Graph and Network Theory**	**2**	The aim of this course is to acquaint students with fundamental concepts, theorems and algorithms of the theory of graphs and networks and their applications in modelling practical optimization problems.	Bachelor's degree studies

7.	**Introduction to Financial Mathematics**	**3**	The main aim of the course is to acquaint students with the basics of financial mathematics. Students learn the capitalization models, the principle of equivalence of interest rates, the principle of equivalence of capitals and the basics of the theory of bills of exchange.	Bachelor's degree studies
8.	**Introduction to Linear Algebra and Analytic Geometry**	**7**	The aim of the course is to familiarize students with complex numbers and polynomials, matrix calculus and its application to solving systems of linear equations, and the basic concepts of analytic geometry.	Bachelor's degree studies
9.	**Introduction to Logic and Set Theory**	**5**	The aim of the course is to familiarize students with the basic concepts of logic and set theory. Students learn the propositional calculus, the calculus of quantifiers, the calculus of sets, the notion of relation and the concept of a countable and uncountable set.	Bachelor's degree studies
10.	**Introduction to the Theory of Complex Functions**	**5**	The aim of the course is to familiarize students with the basics concepts of teory of complex functions. It will cover issues such as the closed Gaussian plane, sequences and series with complex terms, examples of elementary functions of a complex variable, the complex derivative, the Cauchy-Riemann equations and formal derivatives.	Bachelor's degree studies
11.	**Linear Algebra**	**5**	The aim of the course is to familiarize students with two main concepts of linear algebra – the concept of linear space and the concept of linear transformation. Students learn the important examples of finite and infinite dimensional linear spaces, and learn to use the matrix of linear transformation.	Bachelor's degree studies
12.	**Mathematical Analysis I**	**9**	The aim of the course is to familiarize students with the basic concepts of mathematical analysis, such as the notion of real number, the limit of a sequence, the limit of a function, continuity and differentiability of functions of one variable.	Bachelor's degree studies

13.	**Mathematical Analysis II**	**9**	The aim of the course is to familiarize students with indefinite and definite integrals, number series, functional sequence and series, power and Fourier series.	Bachelor's degree studies
14.	**Mathematical Analysis III**	**5**	The aim of the course is to familiarize students with such topics of mathematical analysis as limit and continuity of functions of many variables, partial derivatives, differentiability of maps, extrema of functions of many variables, implicit functions.	Bachelor's degree studies
15.	**Mathematical Analysis IV**	**4**	The aim of the course is to familiarize students with the basic concepts of mathematical analysis, such as the notion of the curve, surface, multiple integral, line integral, surface integral. Students should understand these concepts and gain practical ability to solve related tasks.	Bachelor's degree studies
16.	**Measure Theory**	**4**	The aim of the course is to familiarize students with the fundamentals of measure theory with particular emphasis on Lebesgue measure.	Bachelor's degree studies
17.	**Numerical Methods**	**2**	The aim of the course is to introduce students with the basic numerical methods. During the course students will know methods of solving linear and nonlinear systems equations, interpolation, numerical integration, solving the initial value problems for ordinary differential equations.	Bachelor's degree studies
18.	**Probability**	**5**	The aim of the course is to familiarize students with basic concepts and methods of probability. The main topics are: probability, random variable, parameters of random variable, independence, sequences of random variables, limit theorems.	Bachelor's degree studies
19.	**Statistics**	**4**	The aim of the course is to familiarize students with the basic terminology and methods of mathematical statistics. The main topics which will be discussed: descriptive statistics, estimation, verification of hypothesis, independence of characteristics of population, regression.	Bachelor's degree studies

20.	**Topology of Metric Spaces**	**5**	The aim of the course is to familiarize students with basic notions of topology of metric spaces and their properties. The main topics are: metric, open and closed sets, sequences, complete spaces, connected spaces, compact spaces, continuous functions and their properties.	Bachelor's degree studies
21.	**Advanced Topology**	**5**	The aim of the course is to teach students to recognize topological structures and their basic properties in mathematical objects occurring in geometry and mathematical analysis. The main topics are: topological spaces, metric spaces, bases and subbases, countability, separation axioms, continuity, homeomorphism, topological properties, deformations, knots, compactness, connectedness, complete metric spaces, Brouwer theorem.	Master's degree studies