

Courses in English

Faculty of Mathematics and Applied Physics

Semester 1 (winter)

1. Linear Algebra and Analytic Geometry, 6 ECTS

The aims of the course are: to acquaint students with the construction of complex field, various forms of complex number and fundamental theorem of algebra of complex numbers, to teach students the ability to use matrix algebra and to solve systems of linear equations, to familiarize students with the basic notions of the analytic geometry of the space.

2. Mathematical Analysis I, 8 ECTS

The aim of the course is to familiarize students with the basic concepts of mathematical analysis, such as the notion of real number and the limit of a sequence. Students should understand these concepts and gain practical ability to solve related tasks.

3. Repetitory Course, 2 ECTS

The course which prepares students to study Mathematics.

4. Introduction to Logic and Set Theory, 6 ECTS

The aim of the course is to familiarize students with the basic concepts of logic and set theory. Students should understand these concepts and gain practical ability to solve related tasks.

Semester 2 (summer)

5. Linear Algebra, 6 ECTS

During the course student will be familiar with two main concepts of linear algebra – the concept of linear space and the concept of linear transformation. Student will know the important examples of finite and infinite dimensional linear spaces and learn to use the matrix of linear transformation.

6. Mathematical Analysis II, 8 ECTS

The aim of the course is to familiarize students with the basic concepts of mathematical analysis, such as the notion of the continuity of a function, the derivative, indefinite and definite integrals. Students should understand these concepts and gain practical ability to solve related tasks.

7. Discrete Mathematics, 3 ECTS

The aim of the course is to introduce the basic methods of discrete mathematics.

8. Mathematics of Finance, 3 ECTS

The main aim of study: is to acquaint the students with the basics of financial mathematics and familiarize them with the principles and rules applicable in various financial accounts.

9. Introduction to Computer Science, 4 ECTS

The course includes an introduction to LaTeX typesetting system, Computer Algebra System – MAXIMA and LibreOffice. Students learn typesetting documents with mathematical formulas and perform computations.

Semester 3 (winter)

10. General Algebra and Number Theory, 6 ECTS

The main aim of the course is to teach students the basic notions and theorems from number theory, group theory, rings and fields.

11. Mathematical Analysis III, 5 ECTS

The aim of the course is to familiarize students with such topics of mathematical analysis, such as: number series, functional sequence and series, power and Fourier series, limit and continuity of functions of many variables, partial derivatives, differentiability of maps, extrema of functions of many variables, implicit functions.

12. Computer Science – Mathematical Software, 5 ECTS

The course includes lectures and computer labs. In the laboratory, students learn about practical application of MAXIMA package as a tool supporting the work in the mathematics.

13. Topology of metric spaces, 5 ECTS

The aim of the course is to teach 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.

14. Monographic Lecture I, 3 ECTS

The lecture concerns selected topics in the field of higher mathematics. The subject of the lecture is chosen by students.

Semester 4 (summer)

15. Mathematical Analysis IV, 6 ECTS

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.

16. Proseminar, 2 ECTS

The aim is to teach students the proper way of presenting selected topics of higher mathematics.

17. Probability, 6 ECTS

The purpose is to explore the basic concepts and methods of probability. The main topics are: probability, random variable, parameters of random variable, independence, sequences of random variables, limit theorems.

18. Differential Equations, 5 ECTS

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.

19. Information Technology, 2 ECTS

The aim of the course is to familiarize students with the basic and more advanced functions of selected applications such as: TeX (including: TikZ for creating vector drawings and Beamer for creating presentations), text editor (LibreOffice Writer) and spreadsheet (LibreOffice Calc).

20. Introduction to the Theory of Complex Functions, 3 ECTS

The main topics are: the concept of real numbers - the concept of complex numbers and algebraic operations on complex numbers, analogies and differences in terms of operations on real numbers. Extending the concept of complex functions of a complex variable functions. The ability to calculate derivatives and integrals. Interpretations of these concepts.

Semester 5 (winter)

21. Operational Research / Optimization Theory, 5 ECTS

Students choose one proposition: Operational Research or Optimization Theory every year. The purpose of this course is to introduce quantitative methods and techniques for effective decision-making and constructing models that are used in solving business decision problems.

22. Numerical Methods, 2 ECTS

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.

23. Statistics, 4 ECTS

The main topics which will be discussed: descriptive statistics, estimation, verification of hypothesis, independence of characteristics of population, regression.

24. Monographic Lecture II, 3 ECTS

The lecture concerns selected topics in the field of higher mathematics. The subject of the lecture is chosen by students.

25. Monographic Lecture III, 4 ECTS

The lecture concerns selected topics in the field of higher mathematics. The subject of the lecture is chosen by students.

Semester 6 (summer)

26. Econometrics / Difference Equations, 6 ECTS

Students choose one proposition: Econometrics or Difference Equations every year. The objective is to acquaint the student with basic questions and methods of Econometrics (or Difference Equations).

27. Mathematical Economics, 5 ECTS

The main topics discussed during this course are: mathematical theory of demand, production theory, market equilibrium and company equilibrium, short and long periodic strategy of company, functions and economic models, linear models (IS-LM or supply-demand system), growth models, univariate optimization, constrained optimization, risk and uncertainty in the economics.

28. Actuarial Mathematics, 4 ECTS

The main goal of the course is to acquaint students with the basics of insurance mathematics and familiarize them with the simplest models of risk.