Syllabus of the educational discipline
«MATHEMATICAL ANALYSIS 2»

Cycle of Higher Education	*First cycle of higher education (Bachelor's degree)*
Field of Study	*12 Information Technologies*
Specialty	*123 Computer engineering*
Educational program	*Computer systems and networks*
Discipline status	*Normative*
Teaching language	*English*
Year of studies, semester	*Second year, third semester*
Number of credits ECTS	*4 credits*
Distribution by types of trainings and hours of study	*Lectures, Practical studies, Laboratory studies, Independent training*
Form of final assessment	*Exam*
Teacher	*Syniavska Olga Olexandrivna, associate professor of department of probability theory and mathematical analysis, PhD*
Teacher's contacts	*olga.synyavska@uzhnu.edu.ua*
Course Schedule	*According to the timetable*

The purpose of studying the discipline "Mathematical Analysis" is the formation of the students' ability to abstract thinking, independent analysis and synthesis of complex systems, as well as the ability to use the acquired fundamental knowledge at the stages of problem statement in mathematical and symbolic form.

As a result of mastering the discipline "Linear Algebra and Analytical Geometry" students must demonstrate the following learning outcomes:

knowledge:

- basics of series theory and their applications;
- technologies for the development of functions in power and functional series and their application to solve practical problems in modeling systems and approximate calculations;
- exact and approximate methods for solving ordinary differential equations and their systems in the problems of mathematical modeling of various processes and technical systems.

skills:

- apply methods for solving ordinary differential equations as the main tool for mathematical modeling of various processes and systems;
- correctly move from continuous models of processes and systems to the corresponding discrete models based on the use of functional or power series;
- apply power series for approximate calculation of boundaries and definite integrals, solution of algebraic and differential equations and other practical problems.

Prerequisites for learning

Mathematical analysis 1

Content of the educational discipline

Module 1

Content module 1. Differential Equations.

Theme 1. Differential Equations of the First Order.

Theme 2. The Second Order Differential Equations.

Theme 3. Particular Solution of Differential Equations, Cauchy's Problem.

Theme 4. The Method of Variation of Arbitrary Constants.

Calculation work

Content module 2. Functional and power series.

Theme 5. Functional series.

Theme 6. Power series.

Theme 7. Fourier Series. Laplace Transforms.

Content module 3. Elements of the theory of functions of a complex variable.
Theme 8. Functions of complex variables.
Theme 9. Taylor and Laurent series.
Calculation work
Modular control work
Examination

Material and technical support (software) of the discipline

Mathcad (Geogebra, Desmos)

Course page on the Moodle platform (personal training system)	*Syllabus of the educational discipline, hyperlinks to electronic publications of the discipline, recommended literature, students' attendance, lecture materials, presentations, questions for self-control, methodical materials for laboratory works, tests, tasks for checking students' knowledge.* https://e-learn.uzhnu.edu.ua

Recommended literature

1. Higher mathematics: manual. Kyiv: National aviation university "NAU-druk" publishing, 2009. Part 2. / V. P. Denisiuk, V. G. Demydko, V. K. Repeta, [et al.]. 2009. 243 p.

2. Gavdzinski V.N., Korobova L.N., Maltseva E.V. Functions of several variables: textbook. Odessa: ODESSA NATIONAL A.S. POPOV ACADEMY OF TELECOMMUNICATIONS. 2012. 48 p.

3. Gavdzinski V.N., Korobova L.N. Series: textbook. Odessa: ODESSA NATIONAL A.S. POPOV ACADEMY OF TELECOMMUNICATIONS. 2010. 44 p.

Assessment system of learning outcomes

Current control carried out the semester and evaluated by the amount of points (max is 100 points). A minimum amount, that allows a student to get credit is 35 (max is 100 points).
During the semester, students perform 2 individual computational works. Maximum number of points for each calculated work: 25 points.
Modular control work in each semester is divided into two control works; maximum number of points for each test: 50 points (dilution of tasks is specified in the test).
Final control is carried out in the form of exam and evaluated in points (max is 100 points, min is 35 points). The exam ticket consists of 5 questions - 2 theoretical and 3 practical. The answer to the theoretical question is evaluated by 20 points, and the answer to each practical question is evaluated by 20 points.

ECTS and national grading scale

Mark scale	ECTS	Exam	Test
90 - 100	A	Excellent	Satisfied
82 - 89	B	Good	
74 - 81	C		
64 - 73	D	Satisfactory	
60 - 63	E		
35 - 59	FX	"Unsatisfactory" with possibility to pass the exam again	"Not satisfied" with possibility to pass the exam again
1 - 34	F	"Unsatisfactory" with obligatory repeated study of the discipline	"Not satisfied" with obligatory repeated study of the discipline