(Ф 03.02 – 110)

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Higher Mathematics Department

AGREED
Dean of the Faculty of Architecture, Civil Engineering and Design
_____ V. Karpov
«17» 09 2021

APPROVED
Vice-Rector for Academics
_____ A. Polukhin
«18» 10 2021

Quality Management System
COURSE TRAINING PROGRAM
on
«Higher Mathematics»

Educational Professional Program: «Industrial and civil construction»
«Highways and airfields»
Field of study: 19 «Architecture and construction»
Speciality: 192 «Construction and civil engineering»

Training Form	Semester	Total (hours/ credits ECTS)	Lectures	Practicals	Self-study	HW/ CGP	TP/CP	Semester Grade
Full-time	1, 2, 3	510/17	102	153	255	510/17	1TP-1s 1TP-1s 1TP-1s	examination 1s graded test 2s graded test 3s

Index: CB-5-192-1/21- 2.1.1

Course Training Program on « Higher Mathematics » is developed on the basis of the Educational Professional Program on Air Transportation Management, Bachelor Curriculum and Extended Curriculum № CB-5-192-1/21- 2 1 1 for Specialty 192 «Construction and civil engineering», and corresponding normative documents.

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"01" 10 2021

Document level – 3b
The Planned term between revisions – 1 year
Registered copy

CONTENT

INTRODUCTION

The Course Training Program (CTR) of the discipline is developed on the basis of "Guidelines for the development of the work program of the discipline", approved by the order (071 / rose from 10.07.2019, №088 / rose from 16.10.2019 and relevant regulations.

1. EXPLANATORY NOTE

1.1. Planned results

This discipline is the theoretical basis of the set of knowledge and skills that form the profile of a specialist in the field of architecture.

The purpose of teaching the discipline is to teach students to master the appropriate mathematical apparatus, which should be sufficient for the development of mathematical models associated with the subsequent practical activities of specialists.

The objectives of the discipline are:

- development of logical and algorithmic thinking of students;
- mastering the necessary theoretical knowledge and the main directions of their application in the system of disciplines in the specialty;
- to instill primary skills of mathematical research of applied problems;
- develop the ability to independently use the necessary methods and special literature in solving problems.

As a result of studying this discipline, the student must acquire the following competencies:

- Ability to solve specialized problems and solve practical problems in the field of construction and civil engineering, characterized by complexity and system, based on the application of basic theories and methods of basic and applied sciences;
- Knowledge and understanding of the subject area and understanding of professional activity. Ability to communicate orally and in writing in state and foreign languages, working in an international context;
- know the basic concepts, terms of professional language of communication in the field of architecture and urban planning, in related fields of science with the use of a foreign language;
- apply basic concepts and theories in the field of natural sciences, humanities and technical sciences in the analysis and decision-making in the field of architecture and urban planning;
- analyze and evaluate the factors and requirements that determine the prerequisites for architectural and urban planning and forecasting;
- use software, IT technologies and Internet resources for information support of architectural and urban planning research and design.

The discipline "Higher Mathematics" is the basis for the study of disciplines: "Resistance of materials, structural mechanics", "Engineering geodesy (general course)", "Architecture of buildings and structures", and others.

1.2. Curriculum

The educational material of the discipline is structured on a modular basis and consists of six educational modules, namely:

- training module №1 **«Elements of linear and vector algebra »**
- training module №2 **«Analytical geometry. Introduction to Mathematical Analysis »**
- training module **№3 «Differential and integral calculus»**

-- training module №4 **"Differential equations. Series. Multiple, curvilinear integrals »**

- training module №5 **"Random events»;**

– training module №6 **"Random values"**;each of which is a logically complete, relatively independent, integral part of the discipline, the mastering of which involves a modular test and analysis of the results of its implementation.

Module №1 "Elements of linear and vector algebra"

Topic 1. Determinants, their properties

Content. Basic concepts of determinant theory. Calculation of determinants taking into account their properties.

Topic 2. Matrices, actions with them. Inverse matrix

Content. Basic concepts of matrix theory and operations on them, their application.

Topic 3. Matrix equations. Rank of the matrix

Content. Reduction of the matrix to a trapezoidal shape. Methods for determining the rank of the matrix

Topic 4. Systems of linear equations. Cramer solving systems

Content. A method for solving systems of linear equations according to Cramer's formulas. Conditions for the existence of a solution.

Topic 5. Solving systems by the inverse matrix method

Content. Solving systems of linear equations by the matrix method. Conditions for the existence of a solution.

Topic 6. Solution of systems by the Gaussian method. Kronecker-Capelli theorem

Content. Solving systems of linear equations by Gaussian method. Versatility of the method.

Topic 7. Vectors, operations with them

Content. The concept of vector, linear operations on vectors, collinearity and coplanarity of vectors.

Topic 8. Scalar, vector and mixed product

Content. Nonlinear operations on vectors and their application.

Module № 2 «Analytical geometry. Introduction to Mathematical Analysis »

Topic 2.2.1. Different forms of the equation of a line on a plane.

Content. Writing equations of lines on a plane, research of their properties.

Topic 2.2.2. Different forms of the plane equation.

Content. Writing surface equations; study of their properties.

Topic 2.2.3. Equation of a line in space

Content. Writing equations of lines in space, research of their properties.

Topic 2.2.4. Application of the equation of a line and a plane in space

Content. Applied problems of applying the equation of a line and a plane in space

Topic 2.2.5. Second order curves.

Content. Writing equations of curves of the second order, research of their properties.

Topic 2.2.6. Second order surfaces

Content. Writing equations of second-order surfaces, studying their properties.

Topic 2.2.7. Sequence boundaries, functions, their properties

Content. The concept of function and methods of its task; the concept of function boundary. Calculating the boundaries of numerical sequences and functions.

Topic 2.2.8. Special boundaries (1st and 2nd) and their application.

Content. Calculation of special boundaries, consequences and their application

Topic 2.2.9. Infinitely small. Continuity and discontinuities of functions

Content. The concept of function continuity; the relationship between the continuity of a function and the existence of the boundary of this function. Investigation of the function for continuity.

Module № 3 "Differential and integral calculus"

Topic 2.3.1. Derivative, rules of differentiation, derivatives of elementary functions

Content. The concept of derivative, its mechanical and geometric meaning; basic rules of differentiation. Finding the derivative of the function.

Topic 2.3.2. Differential, higher order derivatives.

Content. The concept of differential, geometric and mechanical content of the differential; derivatives and higher order differentials. Finding the differential of a function.

Topic 2.3.3. Roll, Lagrange, Cauchy theorems.

Content. Proof and application of Roll, Lagrange, Cauchy theorems.

Topic 2.3.4. Taylor's formulas.

Content. Decomposition of a function by Taylor's formula.

Topic 2.3.5. Rise and fall of functions, extremes.

Content. The concept of monotonicity of a function, extremes of a graph of a functio

Topic 2.3.6. Convexity and concavity, asymptotes.

Content. Application of differential calculus to determine the intervals of convexity and concavity of the graph of functions, the concept of asymptote.

Topic 2.3.7. Construction and research of graphs of functions.

Content. Applying differential calculus to a complete study of functions and solving applied problems.

Topic 2.3.8. Construction and study of graphs of functions using higher order derivatives

Content. Apply differential calculus to a comprehensive study of functions using higher-order derivatives and solving applied problems.

Topic 2.3.9. Complex numbers, actions with them. Muavra formula

Content. The concept of a complex number, various forms of representation of a complex number. Operations on complex numbers.

Topic 2.3.10. Initial and indefinite integral. Properties. Table of integrals

Content. The concept of the original function and the indefinite integral; properties of the indefinite integral; table of basic integrals.

Topic 2.3.11. Substitution method

Content. Substitution method, conditions and expediency of its application.

Topic 2.3.12. Integration in parts

Content. Method of integration by parts, conditions and expediency of its application.

Topic 2.3.13. Integration of trigonometric functions

Content. Some methods of integrating trigonometric functions.

Topic 2.3.14. Integration of expressions with a quadratic trinomial

Content. Features of integration of expressions with a quadratic trinomial

Topic 2.3.15. Integration of fractional-rational functions

Content. Features of integration of fractional-rational functions

Topic 2.3.16. Defined integral, properties. Newton-Leibniz formula

Content. The concept of definite integral; properties and methods for calculating definite integrals.

Topic 2.3.17. Application of a definite integral

Content. Features of application of the definite integral: calculation by means of the definite integral of the area of a flat figure, length of an arch, volume of a body, the area of a surface of rotation, work.

Topic 2.3.18. Improper integrals of the 1st kind, properties, conditions of convergence

Content. The concept of improper integral of the 1st kind, the study of convergence.

Topic 2.3.19. Improper integrals of the 2nd kind, properties, conditions of convergence

Content. The concept of improper integral of the 2nd kind, the study of convergence.

Topic 2.3.20. Application of improper integral

Content. Features of application of improper integrals.

Topic 2.3.21. Definitions, boundaries, continuity of functions of many variables

Content. Defining the function of several variables; the concept of the domain, the boundaries of the function of several variables; continuity of the function of several variables.

Topic 2.3.22. Partial derivatives, differentials, derivative by direction, gradient

Content. Methods for finding partial derivatives and differentials of a function of several variables.

Topic 2.3.23. Derivatives of higher orders. Taylor's formula. Necessary and sufficient conditions for the extremum of the function of several variables

Content. Decomposition of a function by Taylor's formula. Application of partial derivatives: finding local extrema, the largest and smallest values of the function of two variables; solving problems to a conditional extremum.

Module № 4 «Differential equations. Series. Multiple, curvilinear integrals »

Topic 2.4.1. Definition, existence and unity of a solution of the differential equation. Equations with separable variables

Content. Basic types of differential equations. Solving first-order differential equations with separable variables.

Topic 2.4.2. Homogeneous and linear equations of the first order. Bernoulli equations and equations in complete differentials

Content. Solution of first-order differential equations: homogeneous differential equations, linear differential equations. Solution of the Bernoulli equation and equations in complete differentials.

Topic 2.4.3. Decrease of the order in the equations of the second order

Content. Solving differential equations of higher orders; methods for reducing the degree of a differential equation.

Topic 2.4.4. Homogeneous differential equations with constant coefficients

Content. Solutions of linear differential equations with constant coefficients.

Topic 2.4.5. Inhomogeneous equations with a special right-hand side

Content. Solve linear differential equations with constant coefficients and with a special right-hand side.

Topic 2.4.6. Systems of differential equations. Cauchy problem for a normal system. Normal system of differential equations with constant coefficients

Content. Solution of the Cauchy problem for a normal system of differential equations with constant coefficients.

Topic 2.4.7. Numerical series, sum of series and its convergence. Properties

Content. Basic concepts and definitions, properties of numerical series; sign-positive series, sufficient signs of convergence.

Topic 2.4.8. Signs of comparison, the sign of D'Alembert. Radical and integral signs of Cauchy

Content. Application of the sign of comparison, the sign of D'Alembert, the radical and integral sign of Cauchy

Topic 2.4.9 Series.with arbitrary members, absolute and conditional convergence. Leibniz sign

Content. Alternating series, absolute and conditional convergence. Application of the Leibniz sign to the study of alternating series on absolute and conditional convergence.

Topic 2.4.10. Functional series. Area of convergence. The concept of power series. Abel's theorems

Content. Functional series; the concept of uniform convergence; power series. Finding the region of convergence of the functional series, in particular the power series.

Topic 2.4.11. Taylor's Series.

Content. Decomposition of a function into a Taylor series.

Topic 2.4.12. Trigonometric series, Fourier coefficients, Fourier series

Content. Decomposition of a function into a Fourier series.

Topic 2.4.13. Double integrals, properties, calculations

Content. The concept of double integral, properties and calculations.

Topic 2.4.14. Integrals in polar coordinates

Content. Conditions and methods of integration in polar coordinates.

Topic 2.4.15. Application of double integrals

Content. Application of double integrals to problems of geometry and mechanics.

Topic 2.4.16. Triple integrals, properties, calculations

Content. The concept of the triple integral, properties and calculations.
Application of ternary integrals to problems of geometry and mechanics.

Topic 2.4.17. Curvilinear integrals by coordinates

Content. The concept of curvilinear integral by coordinates, calculation methods.

Topic 2.4.18. Green's formula. Independence from the integration circuit

Content. Application of curvilinear integrals to problems of geometry and mechanics.

Topic 2.4.19. Surface integral by coordinates, properties, calculations, Gauss-Ostrogradsky formula

Content. The concept of surface integral by coordinates. Application of surface integrals to problems of geometry and mechanics.

Module № 5 "Random events"

Topic 2.5.1. Elements of combinatorics. The concept of random events. Classical definition of probability. Geometric probability

Content. Basic concepts of probability theory; methods for calculating the probabilities of random events. Formulas of combinatorics: combinations, arrangement, permutations. Conditions for the application of geometric and statistical methods for probabilities of random events.

Topic 2.5.2.Theorems on the probability of the sum and product of events

Content. Execution of logical operations on events; calculating the probability of the sum and product of events.

Topic 2.5.3. Probability, Bayesian formula

Content. The concept of direct and inverse problem. Finding the probabilities of hypotheses and conditional probabilities of events. Application of total probability, and Bayes' formula

Topic 2.5.4. Repeated tests. Bernoulli's formula. Poisson's formula. Local and integral Laplace theorems

Content. Bernoulli's formula, conditions of its application to calculation of probability. Peculiarities of application of local and integral Laplace theorem. Practical problems using the formula for calculating the probability of deviation. Poisson's formula, conditions of its application to probability calculation.

Module № 6 "Random variables"

Topic 2.6.1. Discrete random variables. Distribution laws. Numerical characteristics of a discrete random variable

Content. Construction of the probability distribution law of discrete random variables. Numerical characteristics of the probability distribution law of discrete random variables. Signs and characteristics of binomial and geometric distribution laws; Poisson's law. Features of their application.

Topic 2.6.6. Continuous random variables. The concept of integral and differential function. Numerical characteristics of a continuous random variable

Content. Construction of the law of distribution of probabilities of continuous random variables. Function and density of distribution. Calculation of numerical characteristics of the law of distribution of probabilities of continuous random variables.

Topic 2.6.7.Laws of distribution of a continuous random variable

Content. Signs and characteristics of uniform and exponential distribution laws. Features of their application. Signs and characteristics of normal and normalized distribution laws. Features of their application.

2. CONTENT OF THE COURSE

2.1. Educational structurediscipline.

№ p / p	Topic	Volume of training sessions (hours)			
		Total	Lectures	Practi-cal classe	Self-study
1	2	3	4	5	6
1 semester					
Module № 1 Elements of linear and vector algebra					
1.1	Determinants and their properties. Calculation methods	7	2	2	3
1.2	Matrices, actions with them. Inverse matrix.	7	2	2	3
1.3	Matrix equations. Matrix rank Matrix equations. Rank of the matrix	7	2	2	3
1.4	Systems of linear equations. Cramer solution of systems.	7	2	2	3
1.5	Solution of systems by the method of the inverse matrix method	7	2	2	3
1.6	Solution of systems by Gaussian method. Kronecker-Capelli theorem	7	2	2	3
1.7	Vectors, actions with them	7	2	2	3
1.8	Scalar, vector and mixed product	5	2	1	2
1.9	Modular control work № 1	2	-	1	1
	Total modulo № 1	**56**	**16**	**16**	**24**
Module № 2 Analytical geometry. Introduction to mathematical analysis					
2.1	Different forms of the equation of a line on a plane	7	2	2	3
2.2	Different forms of the plane equation	7	2	2	3
2.3	Equation of a line in space	7	2	2	3
2.4	Application of the equation of a line and a plane in space	7	2	2	3
2.5	Second order curves	7	2	2	3
2.6	Surfaces of the second order	7	2	2	3
2.7	Sequence boundaries, functions, their properties	7	2	2	3
2.8	Special boundaries (1st and 2nd) and their consequences	7	2	2	3
2.9	Infinitely small. Continuity and discontinuities of functions	6	2	1	3
2.10	Modular control work № 2	2	-	1	1
	Total modulo № 2	**64**	**18**	**18**	**28**

	In just 1 semester	**120**	**34**	**34**	**52**
	2nd semester				
	Module № 3. Differential and integral calculus				
3.1	Derivative, rules of differentiation, derivatives of elementary functions	6	2	2	2
3.2	Differential, higher order derivatives	6	2	2	2
3.3	Roll, Lagrange, Cauchy theorems	6	2	2	2
3.4	Taylor's formulas	6	2	2	2
3.5	Rise and fall of functions, extremes	5	2	2	1
3.6	Convexity and concavity, asymptotes.	5	2	2	1
3.7	Construction and study of graphs of functions	4	-	2	2
3.8	Construction and study of graphs of functions using higher order derivatives	4	-	2	2
3.9	Complex numbers, actions with them. Muavra formula	6	2	2	2
3.10	Initial and indefinite integral. Properties. Table of integrals	6	2	2	2
3.11	Substitution method	6	2	2	2
3.12	Integration in parts	6	2	2	2
3.13	Integration of trigonometric functions	6	2	2	2
3.14	Integration of expressions with a quadratic trinomial	4	-	2	2
3.15	Integration of fractional-rational functions	4	-	2	2
3.16	Defined integral, properties. Newton-Leibniz formula	6	2	2	2
3.17	Application of a definite integral	6	2	2	2
3.18	Improper integrals of the 1st kind, properties, conditions of convergence	6	2	2	2
3.19	Improper integrals of the 2nd kind, properties, conditions of convergence	6	2	2	2
3.20	Application of improper integral	4	-	2	2
3.21	Definitions, boundaries, continuity of functions of many variables	6	2	2	2
3.22	Partial derivatives, differentials, derivative by direction, gradient	6	2	2	2
3.23	Derivatives of higher orders. Taylor's formula. Necessary and sufficient conditions for the extremum of the function of several variables	6	2	1	3
3.24	Modular control work № 3	3	-	1	2
	Total modulo № 3	**129**	**36**	**46**	**47**
	Module № 4. Differential equations. Rows. Multiple, curvilinear integrals				
4.1	Definition, existence and unity of a solution of the differential equation. Equations with separable variables	6	2	2	2
4.2	Homogeneous and linear equations of the first order. Bernoulli equations and equations in complete differentials	6	2	2	2
4.3	Decrease of the order in the equations of the second order	6	2	2	2

4.4	Homogeneous differential equations with constant coefficients	**6**	2	2	2
4.5	Inhomogeneous equations with a special right-hand side	**5**	2	2	1
4.6	Systems of differential equations. Cauchy problem for a normal system. Normal system of differential equations with constant coefficients	**4**	-	2	2
4.7	Numerical series, sum of series and its convergence. Properties	**6**	2	2	2
4.8	Signs of comparison, the sign of D'Alembert. Radical and integral signs of Cauchy	**6**	2	2	2
4.9	Rows with arbitrary members, absolute and conditional convergence. Leibniz sign	**6**	2	2	2
4.10	Functional series. Area of convergence. The concept of power series. Abel's theorems	**6**	2	2	2
4.11	Taylor's ranks	**6**	2	2	2
4.12	Trigonometric series, Fourier coefficients, Fourier series	**6**	2	2	2
4.13	Double integrals, properties, calculations	**6**	2	2	2
4.14	Integrals in polar coordinates	**6**	2	2	2
4.15	Application of double integrals	**6**	2	2	2
4.16	Triple integrals, properties, calculations	**6**	2	2	2
4.17	Curvilinear integrals by coordinates	**6**	2	2	2
4.18	Green's formula. Independence from the integration circuit	**4**	-	2	2
4.19	Surface integral by coordinates, properties, calculations, Gauss-Ostrogradsky formula	**4**	-	2	2
4.20	Modular control work № 4	**4**	-	1	3
Total modulo № 4		**111**	**32**	**39**	**40**
In just 2 semesters		**240**	**68**	**85**	**87**
3rd semester					
Module № 5. Random events					
5.1	Elements of combinatorics. The concept of random events. Classical definition of probability. Geometric probability	11	2	2 2	5
5.2	Theorems on the probability of the sum and product of events	11	2	2 2	5
5.3	Total probability. Bayes' formula	11	2	2 2	5
5.4	Repeated tests. Bernoulli's formula. Poisson's formula. Local and integral Laplace theorems	9	2	2	5
5.5	Modular control work № 5	7	-	2	5
Total modulo № 5		**49**	**8**	**16**	**25**
Module № 6. Random variables					
6.1	Discrete random variables. Distribution laws. Numerical characteristics of a discrete random variable	11	2	2 2	5
6.2	Continuous random variables. The concept of integral and differential function. Numerical	11	2	2 2	5

	characteristics of a continuous random variable				
6.3	Laws of distribution of a continuous random variable	12	2 1	2 2	5
6.4	Modular control work № 6	7	-	2	5
Total modulo № 6		**41**	**7**	**14**	**20**
In just 3 semesters		**90**	**15**	**30**	**45**
Total for the discipline		**450**	**117**	**149**	**184**

2.2. List of questions to prepare for the exam.

The list of questions and the content of tasks for preparation for the exam are developed by leading teachers and approved by the minutes of the department meeting and brought to the notice of students.

3. EDUCATIONAL AND METHODICAL MATERIALS FROM THE DISCIPLINE

3.1. Teaching methods

The following teaching methods are used in the learning process: explanatory-illustrative, reproductive, problem-based teaching material and research. In addition, students are provided with individual consultations (both when meeting the teacher with the student and online).

The implementation of these methods is carried out during lectures, practical classes, independent problem solving, work with educational literature, etc.

3.2. Recommended Books

Basic literature

3.2.1. Дубовик В.П. Вища математика: Навч. посібник. / В. Дубовик, І. Юрик – К.: А.С.К., 2001. – 681 с.

3.2.2. Вища математика: Збірник задач: Навч. посібник / [В.Дубовик, І. Юрик, І. Вовкодав та ін.] ; за ред. В. Дубовика, І. Юрика. – К.: 2001 – 480 с.

3.2.3. Ластівка І.О. Вища математика : Навч. посібник / І.О. Ластівка, О.І. Безверхий, І.П. Кудзіновська. – К.: НАУ, 2018. – 452 с.

3.2.4. Ластівка І.О. Вища математика. Лінійна та векторна алгебра: методичні рекомендації до самостійної роботи / І.О. Ластівка, Н.І. Затула, В.П. Петрусенко. – К. : НАУ, 2019. – 72 с.

3.2.5. Ластівка І.О. Вища математика. Вступ до математичного аналізу: методичні рекомендації до самостійної роботи / І.О. Ластівка, І.Ю. Ковтонюк, Л.О. Чуб. – К.: НАУ, 2019. – 44 с.

3.2.6. Денисюк В.П. Вища математика: підручникб у 2 ч. – Ч. І. – 2-е вид. виправ. / В.П. Денисюк, В.К. Репета. – К.: НАУ, 2017. – 472 с.

3.2.7. Репета В.К. Вища математика: підручник: у 2 ч. – Ч.2. – 2-е вид. виправ. – К.: НАУ, 2017. – 504 с.

3.2.8. Денисюк В.П. Вища математика. Модульна технологія навчання: Навч. посібник: У 4 ч. – Ч. 1. / В.П. Денисюк, В.К. Репета. – К.: НАУ, 2007. – 296 с.

3.2.9. . Higher mathematics. Linear algebra. Algebra of vectors. Elements of analytic geometry: Method Guide / compiles: I. O. Lastivka, A.O.Antonova, I. S. Klyus, V. I. Trofymenko. – K. : NAU, 2018. – 60 p

3.2.10. Higher mathematics. Probability Theory. Random events: Method Guide to self study / compiles: I. O. Lastivka, I. S. Klyus, V. I. Trofymenko. – K. : NAU, 2018. – 48 p.

3.2.11. Higher mathematics. Probability Theory. Random variables. Method Guide / compiles: I. O. LastivkaI. S. Klyus, V. I. Trofymenko. – K. : NAU, 2019. – 44 p.

Supporting literature

3.2.15.. Математика для економістів : навч. посіб. У 3 ч. Ч. 1 / І.О. Ластівка, В.С. Коновалюк, І.В. Шевченко [та ін.]. – К.: НАУ, 2012. – 432 с.

3.2.16 . Математика для економістів : навч. посіб. У 3 ч. Ч. 2 / І.О. Ластівка, Н.І. Затула, Є.Ю. Корнілович [та ін.]. – К.: НАУ, 2012. – 312 с.

3.2.17. Piskunov N. Differential and Integral Calculus, V.1, M.: Mir Publishers, 1974. – 471 p.

3.2.18. Piskunov N. Differential and Integral Calculus, V.2, M.: Mir Publishers, 1974. –576 p

3.3. Information resources on the Internet

3.3.1. https://erudyt.net/dubovyk-yuryk-vyscha-matematyka-navch posibnyk.

3.3.2. https://pns.hneu.edu.ua/course/view.php?id=929

3.3.3. https: // books.google.com / books? isbn = 9663825383

4. RATING SYSTEM FOR EVALUATION OF KNOWLEDGE AND SKILLS ACQUIRED BY THE STUDENT

4.1.Assessment of certain types of educational work performed by the student is carried out in points in accordance with table 4.1.

Table 4.1

Type of educational work	**Maximum number of points**
	1 semester
Problem solving, answers to theoretical questions, etc. during classroom work	**Module №1, №2**
	10 (total)
To be admitted to the module test №1 (№2) the student must score at least	*6 points*
Execution of modular control work №1 (№2)	20
Total by module №1 (№2)	**30**
Total modules №1 + №2	**60**
Semester exam	**40**
In just 1 semester	**100**

Type of educational work	**Maximum number of points**
	2nd semester
Problem solving, answers to theoretical questions, etc. during classroom work	**Module №3, №4**
	30 (total)
To be admitted to the module test robot3 (№4) the student must score at least	*18 points*
Execution of modular control work №3 (№4)	20
Total by module №3 (№4)	**50**
Total modules №3 + №4	**100**
In just 2 semesters	**100**

Type of educational work	**Maximum number of points**
	3rd semester
Problem solving, answers to theoretical questions, etc.	**Module №5, №6**

during classroom work	10 (total)
To be admitted to the module test №5 (№6) the student must score at least	*6 points*
Execution of modular control work №5 (№6)	20
Total for module №5 (№6)	**30**
Total modules №5 + №6	**60**
Semester exam	**40**
In just 3 semesters	**100**

Credit rating is determined (in points and on a national scale) based on the results of all types of educational work during the semester.

4.2. Completed types of educational work are credited to the student, if he received a positive rating for them.

4.3. The sum of rating assessments received by the student for certain types of completed educational work is the current modular rating assessment, which is recorded in the module control.

4.4. The sum of the final semester module and examination scores in points is the final semester rating, which is converted into scores on the national scale and the ECTS scale.

4.5.Final semester rating in points, on the national scale and the ECTS scale is entered in the test report, study card and individual student curriculum (record book), for example, as follows: 92 / Excellent / A, 87 / Good / B, 79 / Good / C, 68 / Sat./D, 65 / Sat./E, etc.

4.6. The final rating assessment in the discipline, which is taught over several semesters (in this discipline for full-time form - 3 semesters), is defined as the arithmetic mean of the final semester ratings in points, followed by its translation into grades on the national scale and ECTS scale.

The specified final rating assessment in the discipline is entered in the Diploma Supplement.

(F 03.02 - 01)

АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

№ прим.	Куди передано (підрозділ)	Дата видачі	П.І.Б. отримувача	Підпис отримувача	Примітки

(Ф 03.02 – 02)

АРКУШ ОЗНАЙОМЛЕННЯ З ДОКУМЕНТОМ

№ пор.	Прізвище ім'я по-батькові	Підпис ознайомленої особи	Дата ознайом-лення	Примітки

(Ф 03.02 – 04)

АРКУШ РЕЄСТРАЦІЇ РЕВІЗІЇ

№ пор.	Прізвище ім'я по-батькові	Дата ревізії	Підпис	Висновок щодо адекватності

(Ф 03.02 – 03)

АРКУШ ОБЛІКУ ЗМІН

№ зміни	№ листа (сторінки)				Підпис особи, яка внесла зміну	Дата внесення зміни	Дата введення зміни
	Зміненого	Заміненого	Нового	Анульо-ваного			

(Ф 03.02 – 32)

УЗГОДЖЕННЯ ЗМІН

	Підпис	Ініціали, прізвище	Посада	Дата
Розробник				
Узгоджено				