COURSE SYLLABUS
«Higher mathematics»

Degree of higher education - Bachelor
Specialization 073 «Management»
Educational programme «Management. Bachelor»
Academic year: I, semester: I
Form of study: full-time
Number of ECTS credits: 4
Languages of instruction: Ukrainian, English

Lecturers of the course	**Lyudmila Mykolaivna Artemchuk, Andrii Lyubomyrovych Shydlich**
Contact information of the lecturer (e-mail)	**artemchuklm@gmail.com, shidlich@gmail.com**
Course page on eLearn	**https://elearn.nubip.edu.ua/course/view.php?id=3832**

COURSE DESCRIPTION

(up to 1000 printed characters)

"Higher mathematics" is a basic discipline necessary for the development of students' intelligence and the development of their abilities for logical and algorithmic thinking, self-study skills. The purpose of teaching the academic discipline is for students to master the mathematical apparatus necessary for analysis, modeling and solving theoretical and practical problems in the managerial activities of the future manager.

Tasks of the academic discipline "Higher Mathematics":

- mastering the basics of mathematical apparatus, necessary for solving theoretical and practical management problems;
- the ability to independently find, study and apply scientific literature and other information sources and resources on higher mathematics;
- developing skills in mathematical research of applied problems, namely the ability to translate a specific management problem into mathematical language with subsequent construction of its mathematical model;
- the ability to research constructed mathematical models of certain economic processes;
- mastering the methods of processing and analyzing the results obtained during the study of the developed mathematical models.

Competencies of the educational programme:

Integrative competency (IC): Ability to solve complex specialized tasks and practical problems, which are characterized by complexity and uncertainty of conditions, in the field of management or in the learning process, which involves the application of theories and methods of social and behavioral sciences.

General competencies (GC):

GC 8 Skills of using information and communication technologies.

Professional competencies (PC):

SC 2. The ability to analyze the results of the organization's activities, to compare them with the factors of influence of the external and internal environment.

SC 10. The ability to evaluate the performed work, ensure their quality and motivate the personnel of the organization.

SC 12. Ability to analyze and structure organizational problems, form reasonable solutions

Program learning outcomes (PLO) of the educational programme:

PLO6. Demonstrate the skills of searching, collecting and analyzing information, calculating indicators to substantiate management decisions.

COURSE STRUCTURE

Topic	Number of hours (lectures/ practical, seminar)	Results of training	Task	Grading, scores
1st semester				
Module 1				
Topic 1. Determinants.	2/2	Determinants of the 2nd and 3rd order. Determinants of higher orders.	**C.W.** Determinant of the order IV	**10**
Topic 2. Matrices.	**2/2**	Definition, linear operations. Inverse matrix. Rank	**C.W.** Matrix multi-plication	**10**
Topic 3. Systems of linear equations, their application in solving economic and management tasks.	**2/2**		**C.W.** Inverse matrix	**10**
Topic 4. Linear economic models: -Leontiev model (balance analysis) - model of equilibrium prices -linear model of equilibrium trade.	**4/4**	**I.3.** Application of elements of linear algebra for solving economic problems.	**C.W.** Module No.1	**40** **30**
Total for the module				**100**
Module 2				
Topic 1. Application of functions in economic theory.	**1/1**	Function: definition, domain of definition. Definition methods. Inverse, composite, even, odd, periodic functions.	C.W. Function	**5**
Topic 2. The limit of a function. Continuity of function.	**3/3**	Basic theorems about limits. The first and second wonderful limits. Breakpoints and their classification. Asymptotes of the function graph. Local and global properties of functions	C.W. Limit	**10**
Topic 3. The derivative of a function. Differential function	**2/2**	Table of derivatives. Geometric, economic and mechanical content of the derivative. The derivative of a composite, inverse, implicitly given function. Logarithmic differentiation.	C.W. Derivative	**10**
Topic 4. The use of the derivative for the study of the function when solving problems of an economic and managerial nature.	**2/2**	Scheme of research of the function and construction of its graph. Equilibrium price. Elasticity of supply and demand. The connection of elasticity with income. Optimal	C.W.	**10**

		price, marginal costs, optimal volume of production.		
Topic 5. Definition of antiderivative and indefinite integral.	**4/4**	*Properties. Table of integrals. The simplest methods of integration*	C.W. Integral	**10**
Topic 6. The definite integral. Application of the definite integral to geometric and economic problems	**4/4**	Definition, main properties, calculations. Calculation of average values of economic functions, determination of capital gains based on known investments, assessment of the degree of uneven distribution of incomes of the population	IW Integral	**20**
Topic 7. Definition of DE of the 1st order.	**2/2**	Cauchy's problem and theorem. Three types of DE of the first order: with separable variables, homogeneous, linear.	C.W. DEs of the 1st order	**5**
Topic 8. Linear DEs of the 2nd order with constant coefficients	**2/2**		**C.W.** Module No. 2	**30**
Total for the module				**100**
((M1 + M2)/2)*0,7				**70**
Exam				**30**
Total for the 1st semestr				**100**

ASSESSMENT POLICY

Deadlines and Rescheduling Policy:	Assignments submitted after the deadline without valid reasons will be graded lower. Modules can be rearranged with the permission of the lecturer if there are good reasons (for example, sick leave).
Academic Integrity Policy:	Cheating during tests and exams is strictly prohibited (including the use of mobile devices).
Attendance Policy:	Class attendance is mandatory. In case of objective reasons (such as illness or international internships), individual learning may be allowed (in online format by the approval of the dean of the faculty).

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating, points	**National grade based on exam results**	
	exams	**credits**
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

RECOMMENDED SOURCES OF INFORMATION

Main:

1. Legeza V.P., Martynenko M.A., Ivanova Yu.I. Higher mathematics. Textbook for university students, Part I. K.: "The Fourth Wave", 2012. - 368 p.
2. Legeza V.P., Martynenko M.A., Ivanova Yu.I. Higher mathematics. Textbook for university students, Part II. K.: "The Fourth Wave", 2014. - 368 p.

Auxiliary

1. Higher mathematics. Elements of linear algebra and analytic geometry. Study guide [Electronic resource]: study guide for bachelor's degree holders / KPI named after Igor Sikorskyi; structure.

T. O. Yeromina, O. A. Povarova. – Electronic text data (1 file: 3.25 MB). – Kyiv: KPI named after Igor Sikorskyi, 2021. – 115 p. – Title from the screen. https://ela.kpi.ua/handle/123456789/41267https://ela.kpi.ua/handle/123456789/41267
2. Pasichnyk Ya. A. Higher mathematics: textbook. Ostrog: Publishing House of the National University "Ostrog Academy", 2021. 432 p.
3. Panchenko N. G. Higher mathematics: study guide. Part 1 / N. G. Panchenko, M. E. Rezunenko. – Kharkiv: UkrDUZT, 2022. – 232 p.http://lib.kart.edu.ua/handle/123456789/10149
4. Batechko N.G., Pantalienko L.A., Shostak S.V., Tsyupii T.I., Ruzhilo M.Ya. Higher mathematics. Collection of problems. - K.: Publishing House of NUBiP, 2021 - 352 p.
5. Batechko N.G., Pantalienko L.A., Khaidurov V.V., Tsyupii T.I., Shostak S.V. Mathematics manual for students of preparatory courses. - K.: FOP Yamchynskyi O.V., 2020. - 248 p.
6. Dubovik V.P., Yurik I.I. Higher mathematics. - K.: Higher school. 2004. – 647p.
7. Legeza V.P., Martynenko M.A., Ivanova Yu.I. Higher mathematics. Textbook for university students, Part I. K.: "The Fourth Wave", 2012. - 368 p.
8. Legeza V.P., Martynenko M.A., Ivanova Yu.I. Higher mathematics. Textbook for university students, Part II. K.: "The Fourth Wave", 2014. - 368 p.
9. Legeza V.P., Martynenko M.A., Ivanova Yu.I. Higher mathematics. Study guide for university students. K.: "The Fourth Wave", 2011. - 664 p.