

THE MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY
OF ECONOMICS



Vice-Rector responsible for educational and methodical work

Karina NEMASHKALO

**QUANTITATIVE METHODS OF INTERNATIONAL RELATIONS
ANALYSIS**

syllabus of the academic discipline

Branch of knowledge	29 “International Relations”
Specialty	291 “International Relations, Public Communications and Regional Studios”
Level of education	first (bachelor)
Academic program	“International Relations, Public Communications and Regional Studios”

Discipline status	Compulsory
Language of teaching, training and assessment	English

Head of the Department of
Higher Mathematics,
Economic and Mathematical Methods

Lyudmyla MALYRETS

Kharkiv
2022

APPROVED

At the meeting of the Department of Higher Mathematics
Economic and Mathematical Methods
Protocol № 1 dated 31.08.2022

Completed by:

I. Lebedeva, associate professor of the Department of Higher Mathematics,
Economic and Mathematical Methods

Sheet of renewal and re-approved of syllabus of the academic discipline

Academic year	Data of the department meeting – the developer of syllabus of the academic discipline	Protocol number	Signature of the chief of the department

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ СЕМЕНА КУЗНЕЦЯ

"ЗАТВЕРДЖУЮ"

Проректор з навчально-методичної роботи

Каріна НЕМАШКАЛО

КІЛЬКІСНІ МЕТОДИ АНАЛІЗУ МІЖНАРОДНИХ ВІДНОСИН
робоча програма навчальної дисципліни

Галузь знань	29 “Міжнародні відносини”
Спеціальність	291 “Міжнародні відносини, суспільні комунікації та регіональні студії”
Освітній рівень	перший (бакалаврський)
Освітня програма	“Міжнародні відносини, суспільні комунікації та регіональні студії”
Статус дисципліни	обов’язкова
Мова викладання, навчання та оцінювання	англійська

Завідувач кафедри
вищої математики та
економіко-математичних методів

Людмила МАЛЯРЕЦЬ

Харків
2022

ЗАТВЕРДЖЕНО

на засіданні кафедри вищої математики
та економіко-математичних методів
Протокол № 1 від 31.08.2022 р.

Розробник:

Лебедева І.Л., канд. фіз.-мат. наук, доц. кафедри вищої математики та економіко-математичних методів

**Лист оновлення та перезатвердження
робочої програми навчальної дисципліни**

Навчальний рік	Дата засідання кафедри – розробника РПНД	Номер протоколу	Підпис завідувача кафедри

Abstract of the Discipline

The current stage of globalization of the world economy and the formation of the information society determine the active use of the mathematical apparatus in all spheres of practical activity in general and in international business in particular. The application of mathematical methods and models in solving practical problems of economics and management allows: to improve economic information systems by organizing them, identifying shortcomings in existing information and developing requirements for the preparation of new information or its adjustment; increase the accuracy of economic calculations; conduct research that suggests the existence of several alternatives; identify and justify optimal solutions; deepen the quantitative analysis of economic problems; to solve fundamentally new economic problems.

Today it is noticeable the transition to new areas of application of mathematical methods in the development of socio-economic solutions that will determine the future of our country, namely: investment policy planning, modernization of enterprises, forecasting environmental processes, determining both state and private interests in development international projects and so on. In solving these management problems, the leading place is occupied by the methods and means of computational mathematics. Therefore, every future economist, business leader, business owner needs a thorough mathematical training that forms analytical and research competencies, as well as the ability to apply mathematical tools to solve a wide range of problems in their professional activities.

The main purpose of this discipline is: the formation of a holistic system of theoretical knowledge of the mathematical apparatus, which helps to model, analyze and solve economic problems; assistance in mastering mathematical methods that make it possible to study and predict processes and phenomena in the field of future professional activity; development of logical and algorithmic thinking; promoting the formation of skills and abilities of independent analysis of the study of economic problems, the development of the desire for scientific search for ways to improve their work.

Characteristics of the academic discipline

Academic year	1
Term	1
Number of credits ECTS	5
Form of final control	Test

Structural and logical scheme of studying the academic discipline

Previous academic disciplines	Next academic disciplines
Algebra (Mathematics)	Information and Analytical Tools of International Business
Geometry (Mathematics)	International Trade in Goods, Services, Technologies
	Economic Diplomacy

Competences and result of mastering the academic discipline

Competences	Learning outcomes
<p>3K6. The ability to generate new ideas (creativity).</p> <p>CK1. The ability to distinguish signs and trends of development, understand the nature, dynamics, principles of organization of international relations, public communications and/or regional studies.</p> <p>CK2. The ability to analyze international processes in various contexts, including political, security, legal, economic, social, cultural and informational</p>	<p>PH01. To know and understand the nature of international relations and regional development, the evolution, the state of theoretical studies of international relations and world politics, as well as the nature and sources of state policies in the international arena and the activities of other participants in international relations</p>
<p>CK9. The ability to apply knowledge of the characteristics of the development of countries and regions, the features and regularities of global processes and the place of individual states in them to solve complex specialized tasks and problems</p>	<p>PH05. To know the nature and mechanisms of international communications</p>
<p>3K6. The ability to generate new ideas (creativity).</p> <p>CK5. The ability to analyze the influence of the world economy, international law and domestic politics on the structure and dynamics of international relations and foreign policy of states.</p>	<p>PH06. To know the nature and character of interactions of individual countries and regions at the global, regional and local levels</p>
<p>3K6. The ability to generate new ideas (creativity).</p> <p>CK1. The ability to distinguish signs and trends of development, understand the nature, dynamics, principles of organization of international relations, public communications and/or regional studies.</p> <p>CK2. The ability to analyze international processes in various contexts, including political, security, legal, economic, social, cultural and informational</p>	<p>PH07. Carry out a description and analysis of the international situation, collect from various sources the necessary information about international and foreign political events and processes</p>
<p>CK10. The ability to analyze the structure and dynamics of international public communications, to identify their impact on the international system, state and public institutions</p>	<p>PH08. To collect, process and analyze large volumes of information about the state of international relations, foreign policy of Ukraine and other states, regional systems, international communications</p>

The syllabus of the academic discipline

The themes of lectures

Thematic module 1. Linear algebra and functions

Theme 1. Elements of the theory of matrices and determinants.

Theme 2. General theory of systems of linear algebraic equations.

Theme 3. Functions and graphics

Thematic module 2. Elements of probability theory and mathematical statistics

Theme 4. Empirical and logical foundations of probability theory. The classical definition of probability

Theme 5. Conditional probability, dependent and independent events. Full group of events. The formula of total probability. Bayesian formula.

Theme 6. Bernoulli's scheme. Discrete random variables, distribution law, basic characteristics.

Theme 7. Continuous random variables. Uniform, exponential and normal distribution laws

Theme 8. Selective method. Numerical characteristics of the sample

Theme 9. Elements of correlation-regression analysis. Correlation of qualitative indicators

Theme 10. Pairwise and multivariate regression

Theme 11. Elements of game theory.

Theme 12. Game theory in international relations

The list of practical and laboratory classes, as well as questions and tasks for independent work is given in the table "Rating-plan of the discipline".

Teaching and learning methods

During the teaching of the academic discipline "Quantitative Methods of International Relations Analysis" in order to activate the educational and cognitive activity of students, it is envisaged to use interactive forms of teaching the material, in particular such teaching methods as: lectures of a problem nature (Themes 2, 4, 8, 9-12), mini-lectures (Themes 3, 5), work in small groups (Themes 3, 9, 11), discussions and brainstorming (Themes 6, 9, 11, 12), presentations (Themes 1-12), computer simulations (Themes 2, 6-9), individual research work (Themes 2, 8, 9). During the lecture, practical and laboratory classes, the following teaching methods are used: explanatory and illustrative, partly research and research methods.

The order of assessment of studying results

The system of assessment of formed competencies of students during the study of this discipline takes into account the types of classes that, according to the curriculum of the discipline, include lectures, practical classes, laboratory work, as well as students' independent work. Assessment of competencies formed in students is carried out on a cumulative 100-point system.

Control measures include:

current control, carried out during the semester during lectures, practical classes and laboratory works and evaluated by the amount of points scored. The maximum amount is 100 points; the minimum amount that allows a student to get a credit of 60 points.;

final / semester control, carried out in the form of a semester test, according to the schedule of the educational process.

Current control is carried out within a term during:

lectures – in the form of colloquia (during the semester students write two colloquia; the maximum number of points for both colloquia is 12 points);

practical classes – in the form of tasks of written tests in practical classes (during the semester students perform two written tests; the maximum number of points for two tests is 12 points);

laboratory classes – in the form of defense of the report on laboratory work (during the semester students perform 6 laboratory works; the maximum number of points for the performance of six laboratory works is 24 points);

independent work:

in the form of homework (during the semester, students complete six homework assignments – the maximum number of points for completing six homework assignments is 21 points);

in the form of creative work (during the semester students perform one creative work – the maximum number of points is 7).

Final control of knowledge and competencies of students in the discipline is carried out on the basis of a semester test, the task of which is to test students' understanding of the program material in general, logic and relationships between individual sections, ability to creatively use accumulated knowledge, ability to formulate their attitude to a particular problems of academic discipline, etc.

It should be assessed student's progress, if a sum of points, obtained as the total result of an assessment by all forms of a control, equals or exceeds 60. The total result in points for the semester is: "60 or more points – credited", "59 or less points – not credited" and is entered in the "Statement of performance" of the discipline.

Forms of assessment and distribution of points are given in the table "Rating-plan of the discipline"

Rating-plan of the discipline

Theme	Forms and types of teaching		Forms of evaluation	Max points
Theme 1	<i>Classroom work</i>			
	Lecture	<i>Lecture №1.</i> Elements of the theory of matrices and determinants	–	–
	Laboratory lesson	<i>Laboratory task №1.</i> Actions on matrices on the example of problems of economic content. Execution of practical tasks	LW №1	3
	<i>Individual work</i>			
	Questions and tasks for self-study	Search, selection and review of literary sources on the subject of the discipline. Study of lecture material	–	–
	<i>Classroom work</i>			
	Lecture	<i>Lecture №2.</i> Elements of the theory of matrices and determinants (the end)	–	–
Practical lesson	<i>Practical task №1.</i> Calculation of determinants using elementary transformations	–	–	

	Individual work			
	Questions and tasks for self-study	Study of lecture material, calculations in MS Excel	Homemade work	3
Theme 2	Classroom work			
	Lecture	Lecture №3. General theory of systems of linear algebraic equations	–	–
	Laboratory lesson	Laboratory task №2. Solving systems of linear equations in MS Excel	LW №2	3
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	–	–
	Classroom work			
	Lecture	Lecture №4. General theory of systems of linear algebraic equations (the end)	–	–
	Practical lesson	Practical task №2. Investigation of the system of linear equations. Determining the general solution of a system of linear algebraic equations	–	–
	Individual work			
	Questions and tasks for self-study	Study of lecture material, preparation for practical classes, solving problems using MS Excel	Homemade work	3
Theme 3	Classroom work			
	Lecture	Lecture №5. Functions and graphics		
	Laboratory lesson	Laboratory task №3. Investigation of the function of one variable. Plotting functions	LW №3	3
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	–	–
	Classroom work			
	Lecture	Lecture №6. Functions and graphics (the end)	–	–
Practical lesson	Practical task №3. Graphical interpretation of empirical data	WT №1	12	
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	Homemade work	3

Theme 4	Classroom work			
	Lecture	Lecture №7. Empirical and logical foundations of probability theory. The classical definition of probability	Colloquium №1	12
	Laboratory lesson	Laboratory task №4. Determining the probability of a random event by the classical definition	LW №4	3
	Individual work			
Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	–	–	
Theme 5	Classroom work			
	Lecture	Lecture №8. Conditional probability, dependent and independent events. Full group of events. The formula of total probability. Bayesian formula	–	–
	Practical lesson	Practical task №4. Determining the probability of the probability formula and the Bayesian formula	–	–
	Individual work			
Questions and tasks for self-study	Study of lecture material. Execution of practical tasks in MS Excel	Homemade work	3	
Theme 6	Classroom work			
	Lecture	Lecture №9. Bernoulli's scheme. Discrete random variables, distribution law, basic characteristics	–	–
	Laboratory lesson	Laboratory task №5. Calculation of numerical characteristics of the distribution of a discrete random variable	LW №5	3
	Individual work			
Questions and tasks for self-study	Review of literature on the subject; doing homework using MS Excel	–	–	
Theme 7	Classroom work			
	Lecture	Lecture №10. Continuous random variables. Uniform, exponential and normal distribution laws	–	–
	Practical lesson	Practical task №5. Determination of numerical characteristics of a continuous random variable	Homemade work	3
	Individual work			
Questions and tasks for self-study	Study of lecture material; performance of practical tasks	–	–	

Theme 8	Classroom work			
	Lecture	Lecture №11. Selective method. Numerical characteristics of the sample	–	–
	Laboratory lesson	Laboratory task №6. Evaluation of numerical characteristics of random variable for the sample in MS Excel	LW №6	3
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	–	–
Theme 9	Classroom work			
	Lecture	Lecture №12. Elements of correlation-regression analysis. Correlation of qualitative indicators	–	–
	Practical lesson	Practical task №6. Research of correlation of qualitative indicators, construction of regression model	–	–
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks in MS Excel	Homemade work	3
Theme 10	Classroom work			
	Lecture	Lecture №13. Pairwise and multivariate regression	–	–
	Laboratory lesson	Laboratory task №7. Application of correlation-regression analysis to the study of a two-dimensional random variable	LW №7	3
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks. Preparation for the presentation of an independent creative task	Creative work	7
Theme 11	Classroom work			
	Lecture	Lecture №14. Elements of game theory	–	–
	Practical lesson	Practical task №7. Matrix game for two persons	WT №2	12
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	Homemade work	3

Classroom work				
Theme 12	Lecture	Lecture №15. Game theory in international relations	Colloquium №2	12
	Laboratory lesson	Laboratory task №8. Building a mathematical model of the antagonistic game in international relations	LW №8	3
	Individual work			
	Questions and tasks for self-study	Study of lecture material. Execution of practical tasks	–	–
Total				100

Recommended reading

Main

1. Вища математика : базовий підручник для вузів / під ред. В. С. Пономаренка. – Харків : Фолюс, 2014. – 669 с.
2. Железнякова Е. Ю. Теорія ймовірностей та математична статистика [Електронний ресурс] : практикум / Е. Ю. Железнякова, Л. О. Норік ; Харківський національний економічний університет ім. С. Кузнеця. - Електрон. текстові дан. (9,34 МБ). - Х. : ХНЕУ ім. С. Кузнеця, 2019. - 320 с. : іл. - Загол. з титул. екрану. - Бібліогр.: с. 307-308.
3. Малярець Л. М., Математика для економістів. Теорія ймовірностей та математична статистика: навчальний посібник. Ч. 3 / Л. М. Малярець, І. Л. Лебедева, Л.Д. Широкоград. – Харків : Вид. ХНЕУ, 2011. – 568 с.
4. Малярець Л.М. Дослідження операцій та методи оптимізації [Електронний ресурс] : практикум у 2-х частинах. - Ч 1 / Л.М. Малярець, І.Л. Лебедева, Л.О Норік. - Х. : ХНЕУ ім. С. Кузнеця, 2018. - 169 с.
5. Малярець Л. М. Теорія ймовірностей та математична статистика: навчальний посібник / Л.М. Малярець, Е.Ю. Железнякова, І.Л. Лебедева та ін. – Харків. : Вид. ХНЕУ, 2010. – 404 с.
6. Місюра Є. Ю. Теорія ймовірностей. Конспект лекцій / Є. Ю. Місюра. – Харків : Вид. ХНЕУ, 2013. – 95 с. (Англ. мов.).

Additional

7. Малярець Л. М. Математика для економістів : навч. посіб. / під ред. Л. М. Малярець. – Харків : Вид. ХНЕУ, 2011. – 568 с.
8. Малярець Л. М. Математика для економістів : навч. посіб. у 2-х ч. Ч. 1. / Л. М. Малярець, Л. М. Афанасьєва, А. В. Ігначкова. – Харків : Вид. ХНЕУ, 2011. – 393 с.
9. Математика для економістів: практ. посіб. до розв'язання задач економічних досліджень в MatLab / Л. М. Малярець, Є. В. Резнік, О. Г. Тижненко. – Харків : Вид. ХНЕУ, 2008. – 212 с.
10. Taboga M. Lectures on Probability Theory and Mathematical Statistics – 3rd Edition – CreateSpace Independent Publishing Platform, 2017. – 670 p.

Information resources on the Internet

11. Вища математика. Методичні рекомендації до самостійної роботи за темою "Диференціальні рівняння" для студентів усіх спеціальностей першого (бакалаврського) рівня / укл. А. В. Воронін, О. В. Гунько. – Харків : ХНЕУ ім. С. Кузнеця, 2018. – 75 с. [Електронний ресурс] – Режим доступу : <http://repository.hneu.edu.ua/handle/123456789/26217>
12. Вища та прикладна математика. Методичні рекомендації до практичних завдань з розділу "Вища математика" для студентів спеціальності 242 "Туризм" першого (бакалаврського)

- рівня / укл. Е.Ю. Железнякова, Т.В. Сілічова. – Харків : ХНЕУ ім. С. Кузнеця, 2019. – 99 с. [Електронний ресурс] – Режим доступу : <http://repository.hneu.edu.ua/handle/123456789/21049>
13. Вища та прикладна математика. Метод. рек. до практ. завдань із розд. "Теорія ймовірностей та математична статистика. Математичне програмування. Дослідження операцій" для студ. спец. 242 "Туризм" першого (бакалаврського) рівня / укл. Е. Ю. Железнякова, Т. В. Сілічова. – Харків : ХНЕУ ім. С. Кузнеця, 2020. – 98 с. [Електронний ресурс] – Режим доступу : <http://repository.hneu.edu.ua/handle/123456789/23381>
14. Железнякова Е.Ю. Теорія ймовірностей та математична статистика : методичні рекомендації до самостійної роботи з теми "Емпіричні та логічні основи теорії ймовірностей. Основні теореми теорії ймовірностей" для студентів усіх спеціальностей / Е.Ю. Железнякова, І.Л. Лебедева, С.С. Лебедев // Мультимедійне видання. – Харків, ХНЕУ ім. С. Кузнеця, 2018. [Електронний ресурс] – Режим доступу : <http://ebooks.git-elt.hneu.edu.ua/tvms>
15. Железнякова Е.Ю. Теорія ймовірностей та математична статистика : методичні рекомендації до самостійної роботи з теми "Схема незалежних випробувань. Закони розподілу та числові характеристики дискретної випадкової величини" для студентів усіх спеціальностей / Е.Ю. Железнякова, І.Л. Лебедева, С.С. Лебедев // Мультимедійне видання. – Харків, ХНЕУ ім. С. Кузнеця, 2020. [Електронний ресурс] – Режим доступу : <https://pns.hneu.edu.ua/mod/url/view.php?id=274068>
16. Железнякова Е.Ю. Теорія ймовірностей та математична статистика : методичні рекомендації до самостійної роботи з теми "Основні закони розподілу неперервної випадкової величини" для студентів усіх спеціальностей / Е.Ю. Железнякова, І.Л. Лебедева, С.С. Лебедев. [Електронний ресурс] – Режим доступу : <https://pns.hneu.edu.ua/course/view.php?id=8277>
17. Misiura, Ie. Yu. Probability Theory and Mathematical Statistics : multimedia guidelines to independent work for Bachelor's (first) degree students of all specialties / Ie. Yu. Misiura, S. S. Lebedev // Мультимедійне видання. – Харків, ХНЕУ ім. С. Кузнеця, 2022. [Електронний ресурс] – Режим доступу : <https://pns.hneu.edu.ua/mod/url/view.php?id=468670>
18. Quantitative methods of international relations analysis (6.291.010), Associate Professor I. L. Lebedeva [Electronic resource] – Access mode : <https://pns.hneu.edu.ua/course/view.php?id=5464>