

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



ЕКОНОМЕТРИКА

робоча програма навчальної дисципліни

Галузь знань **05 Соціальні та поведінкові науки**
Спеціальність **051 Економіка**
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Освітня програма **Міжнародна економіка**

Статус дисципліни **обов'язкова**
Мова викладання, навчання та оцінювання **англійська**

Завідувач кафедри вищої математики
та економіко-математичних методів

Людмила МАЛЯРЕЦЬ

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APPROVED

at the meeting of the department of higher mathematics and economic mathematical methods

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

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

The annotation of the academic discipline

The task of the econometrics is a construction of models of economic objects and processes in order to describe, optimize, analyze, forecast, provide analytical support for these objects and processes when making decision at all levels of management. Thus, modelling is a fundamental basis of the methodology of management of the economy. Economic and mathematical models are constructed with the help of mathematical methods. Economic and mathematical methods are tools for learning and investigation of economic systems of different complexity. They form a fundamental basis for solving real analytical problems in different fields of activity of management subjects.

The fundamental basis in the mathematical preparation of economists and managers is the academic discipline “Econometrics” which is a basic discipline of the natural scientific series and a component of the structural logical scheme which is provided for the educational professional program of Bachelor's (first) degree students of speciality 051"International economics".

The basic problems of teaching the academic discipline is giving students knowledge of the basic parts of econometrics; raising the level of the fundamental mathematical training of students with intensification of its applied direction, mastering the fundamentals of economic and mathematical methods and application of this knowledge to the economic investigations for solving economic problems, forming skills in the application of elements of economic and mathematical methods to investigations where methods of econometrics are applied as an instrument of investigation and solving optimization economic problems for forming models of economic processes and developments, acquiring the necessary theoretical and practical knowledge for solving specific problems which are set in the process of forming and a construction of economic and mathematical models, and obtaining the required mathematical knowledge for the study of other disciplines.

The basic condition for mastering of this discipline is students' knowledge of Higher Mathematics, Econometrics, and Economic Theory, Microeconomics, Manufacturing Organization.

The purpose of the discipline is to form future specialists' basic mathematical knowledge for solving theoretical and practical problems in professional activity of a competent specialist in any sphere of his activity, skills in analytical thinking and skills in using mathematical knowledge for formation of real processes and developments, and for solving economic problems.

The characteristics of the academic discipline

Academic year	2 nd
Term	4 th
Number of credits of ECTS	5
Form of the final control	exam

The structural and logical scheme of studying the academic discipline:

Previous academic disciplines	Next academic disciplines
Higher mathematics	Statistics
Probability theory and mathematical statistics	Economic analysis
Informatics	Economic and mathematical methods and models and their realization using PC

Competences and results of mastering the academic discipline:

Professional competences (PC)	Learning outcomes (LO)
PC14 (CK14)*. Ability to analyze in depth problems and phenomena in one or more professional areas, taking into account economic risks and possible	LO1 (PH1)*. Associate yourself as a member of civil society, the scientific community, recognize the rule of law, in particular in professional activities, understand and be able to enjoy their rights and freedoms, show

socio-economic consequences	respect for the rights and freedoms of others, including team members
PC9 (CK9). An ability to predict on the basis of standard theoretical and econometric models of socio-economic processes.	LO2 (PH2). Reproduce moral, cultural, scientific values, increase the achievements of society in the socio-economic sphere, promote a healthy lifestyle
PC4 (CK4). An ability to explain economic and social processes and phenomena on the basis of theoretical models, analyze and interpret the results.	LO3 (PH3). Know and use an economic terminology, explain the basic concepts of micro- and macroeconomics
PC6 (CK6). An ability to use economic and mathematical methods and models to solve economic problems. PC14 (CK14). Ability to analyze in depth problems and phenomena in one or more professional areas, taking into account economic risks and possible socio-economic consequences	LO4 (PH4). Understand the principles of economics, features of economic systems
PC11 (CK11). Ability to interpret economic decisions on the basis of understanding the laws of economic systems and processes using modern methodological tools. PC12 (CK12). An ability to independently identify problems of an economic nature in the analysis of specific situations, to suggest ways to solve them.	LO5 (PH5). Use analytical and methodological tools to interpret proposals and make management decisions by various economic agents (individuals, households, enterprises and public authorities).
PC5 (CK5). Understanding the features of the modern world and national economy, their institutional structure, a substantiation of the directions of social, economic and foreign economic policy of the state	LO7 (PH7). Explain the models of socio-economic phenomena in terms of fundamental principles and knowledge based on an understanding of the main directions of a development of economics
PC4 (CK4). An ability to explain economic and social processes and phenomena on the basis of theoretical models, analyze and interpret the results. PC6 (CK6). An ability to use economic and mathematical methods and models to solve economic problems.	LO8 (PH8). Use corresponding economic and mathematical methods and models to solve economic problems.

* СК – спеціальні (фахові) компетентності, PH – результати навчання

The syllabus of the academic discipline The list of themes of lectures

Content module 1. Pair and multiple linear regression models

Theme 1. Particular properties of econometric models and principles of their construction.

Theme 2. A pair regression and correlation in econometric research

Theme 3. General questions in a construction of a multiple regression model

Theme 4. An estimation of parameters of a linear equation of a multiple regression and its quality in a whole.

Theme 5. Particular equations of a regression. Particular correlation. A forecasting using regression models in international economics.

Theme 6. Problems in the construction of linear multiple regression models

Content module 2. Types of econometric models

Theme 7. The generalized schemes of regression analysis.

Theme 8. Systems of econometric equations.

Theme 9. Dynamic econometric models

Theme 10. Modeling one-dimensional time series

Theme 11. Learning relationships using time series

Theme 12. Factor analysis and its application to solving problems in international economics

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

Teaching and learning methods

The methods used in teaching the discipline "Econometrics" are aimed at the formation of competencies that are defined for each topic of the discipline. During lectures, practical and laboratory classes the use of explanatory-illustrative, reproductive methods with the use of elements of problem statement, as well as research and heuristic methods are envisaged. In order to activate and stimulate the educational and cognitive activities of students, presentations (during lectures) are used, as well as individual research work, the result of which is the writing of a scientific article.

The basic difference of active and interactive methods of education from traditional ones is not only defined by the methods and techniques of teaching, but also by a high effectivity of the educational process, which reveals itself in: the high motivation of students; consolidation of theoretical knowledge in practice; improvement of students' consciousness; forming the ability to make an independent decision; forming the ability to approve collective decisions; forming the ability for social integration; getting the skills in resolving conflicts; development of the ability to reach compromises.

Work in small groups gives an opportunity to structure practical studies in the form and content, gives a possibility for each student's partaking in the work on the theme under study, stimulates forming personal qualities and experience of social communication (*themes: 1, 6, 7, 10, 11*).

A computer simulation (game) is an education method, which is based on the use of a specific computer program in order to get visual modelling of a process. Students can change the parameters and data, decisions and analyze the results of such decisions. The purpose of using this method is the development of systematic thinking of students, their ability to plan, form skills to identify and analyze problems, compare and estimate alternatives, make optimal decisions and work under the condition of a limited time (*themes: 2, 3, 6, 8*).

Banks of a visual support help to intensify the education process of studying the themes of the academic discipline with the help of visualization (*themes: 2, 5, 8, 9*).

Mini-lectures provide for the delivery the educational material during a short-length segment of time and they are characterized by a significant content, complexity of logical constructions, forms, proofs and generalizations. They are conducted, as a rule, as a part of a study-investigation. Mini-lectures differ from full-size lectures by a shorter duration. Usually, they last no more than 10 – 15 minutes and they are used in order to give briefly new information for all students. Mini lectures are often used as parts of a whole theme, which it is desirable to teach as a full-size lecture in order to avoid the audience's getting tired. Then the information is given by turn as several particular fragments, between them other forms and methods of study are used (*themes: 4, 5, 9, 12*).

Brainstorming is a method of solving urgent tasks, its core lies in expressing as many ideas as possible in a short period of time, discussing and selecting them (*themes: 4, 7, 11*).

The order of assessment of studying results

Simon Kuznets KhNUE uses a cumulative (100-point) evaluation system. The system of assessment of the formed competencies of students during the study of the 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 ways include:

current control which is carried out within a term during lectures, practical studies and laboratory works and it is assessed as a sum of accumulative points (the maximum equals 60 points; the minimum which makes it possible for a student to pass an exam, equals 35 points);

module control which is carried out in the form of a modular control work, which includes theoretical and practical tasks and with taking into account the current control according to a thematic module provides an integral assessment of student's results after learning the material of a logically completed part of the discipline (or a thematic module);

final/term control, which is carried out as a terminal exam, according to the schedule of the educational process.

Assessment of student's knowledge during practical studies and carrying out laboratory works is conducted on the accumulative system according to the following criteria: understanding, the degree of the mastery of the theory and methodology of problems which are considered; the degree of the mastery of the factual material of the academic discipline; familiarizing with the recommended literary sources and modern literature on the questions which are considered; the ability to connect theory and practice in the consideration of particular examples, solving problems, carrying out laboratory works, carrying out calculations in the process of doing homework and tasks which are considered in class; the logic, structure, style of presenting the material in written works and in oral answers in class, the ability to ground one's position, carry out generalization of the information and draw conclusions.

General criteria for evaluating extracurricular independent work of students are: depth and strength of knowledge, level of thinking, ability to systematize knowledge on individual topics, ability to draw sound conclusions, mastery of categorical apparatus, skills and techniques of practical tasks, ability to find necessary information, to carry out its systematization and processing, self-realization in practical and laboratory classes.

The general criteria for the assessment of independent work of students are profound and deep of knowledge, the level of thinking, skills in systematization knowledge on particular themes, skills in drawing conclusions, attainments and techniques of carrying out practical tasks, the ability to find necessary information, carry out its classification and processing, self-realization in practical and laboratory studies.

The criteria for assessment of independent creative work and independent tests are: the ability to carry out a critical and an independent estimation of the defined problem questions; skills in the explanation of alternative views and availability of a students' own point of view, position on the defined problem question; using the analytical approach; the quality and accuracy of expressing the thought; the logic, structure and explanation of conclusions about a particular problem; independence of carrying out of the work; grammatical correctness of the presentation of the material; using the methods of comparison, generalization of the concepts and facts; the design of the work; the quality of presentation.

The total number of points is 60, which are distributed as lectures (including 2 colloquiums (12 points) and one independent creative work (6 points), practical studies (including 3 written tests (18 points) and homework (12 points)) and laboratory studies (including 6 laboratory works (12 points)).

The final control (the exam) of knowledge and competences of students on the academic discipline is carried out on the base of the term exam. The examination paper includes all themes of the syllabus of the discipline and provides for assessment of the knowledge level and a degree of the mastery of corresponding competences of students. The purpose of the exam is to test student's understanding of the syllabus material on the whole, the logic and relations between its particular parts, the skills in the creative use of the stored knowledge, the ability to formulate one's attitude to a

particular problem of the academic discipline and so on. The competent approach to the assessment of the exam implies measuring the level of the student's mastery of the competences provided by the qualifying requirements.

Each examination paper contains 5 practical tasks, including two first-level (diagnostic) tasks, two second level (situational) tasks and one third level (diagnostic and heuristic) task.

In the case of irreproachable fulfillment of all the examination tasks with the demonstration of deep knowledge of the academic discipline, skills in the practical use of the formed competences which are based on the ability to analyze and solve a wide range of tasks, a high level of completing the written work the student obtains 40 points. The minimum possible number of points that you need to get on the exam is 25.

A student can't be allowed to take the exam, if the number of points, obtained during the current and module control according to the thematic modules during the term, does not make 35 points. After the examination period the dean of the department gives a notice about sitting the failed exams. In a given period the student adds the required points.

The final mark on the academic discipline is calculated as a summa of points, obtained during an exam, and points, obtained during a current control by an accumulative system.

The result of a terminal exam is assessed in points (the maximum is 40 points, the minimum of a quantity, which is passed, equals 25 points) and it is entered into the corresponding column of "Examination mark sheet".

The final mark of the academic discipline is calculated according to the points obtained during the exam and points obtained during the current control on the accumulative system.

The student should be considered certified, if a sum of points, obtained as the total result of an assessment by all forms of a control, equals or exceeds 60, taking into account that the minimal possible quantity of points by a current and a module control during a term equals 35 and the minimal possible quantity of points, obtained on an exam, equals 25. The total result in points during the term is "60 and more points mean passed", "59 and less points mean failed" and it is entered into the "Mark sheet" on the academic discipline.

The final grade is set according to the scale given in the table "The scales of assessment: national and ECTS".

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

The scales of assessment: national and ECTS

Sum of points including all forms of study	Mark on the ECTS scale	Mark on the national scale	
		for an exam	for a test
90 – 100	A	excellent	passed
82 – 89	B	very good	
74 – 81	C	good	
64 – 73	D	satisfactory	
60 – 63	E		
35 – 59	FX	satisfactory	failed
1 – 34	F		

Rating-plan of the academic discipline

Them	Forms and types of study		Forms of assessment	Maximal point
1	2		3	4
Them	<i>Class work</i>			
	Lecture	Lecture 1. Particular properties of econometric models and principles of their		

		construction		
	Practical study	Practical study 1. Particular properties of econometric models and principles of their construction. A pair regression		
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out practical homework		
Theme 2	<i>Class work</i>			
	Lecture	Lecture 2. A pair regression and correlation in econometric research		
	Laboratory study	Laboratory work 1. A pair regression model. A checking of a significance of parameters of a pair regression	laboratory work	2
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.		
Theme 3	<i>Class work</i>			
	Lecture	Lecture 3. General questions in a construction of a multiple regression model		
	Practical study	Practical study 2. Multiple regression models: LSM of estimations of parameters of a model		
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out practical homework	homework	2
Theme 4	<i>Class work</i>			
	Lecture	Lecture 4. An estimation of parameters of a linear equation of a multiple regression and its quality in a whole.		
	Laboratory study	Laboratory work 2. A construction of a multiple model of a linear regression	laboratory work	2
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.		
Theme 5	<i>Class work</i>			
	Lecture	Lecture 5. Particular equations of a regression. Particular correlation. A forecasting using regression models in international economics.		
	Practical study	Practical study 3. Multiple regression models: checking of a significance of an econometric model in a whole and its parameters	written test	6
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.	homework	2
T	<i>Class work</i>			

	Lecture	Lecture 6. Problems in the construction of linear multiple regression models	colloquium	6
	Laboratory study	Laboratory work 3. An investigation of a multiple model of a pair regression	laboratory work	2
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.		
Theme 7	<i>Class work</i>			
	Lecture	Lecture 7. The generalized schemes of regression analysis		
	Practical study	Practical study 4. Problems in the construction of linear multiple regression models		
	<i>Independent work</i>			
Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out practical homework		homework	2
Theme 8	<i>Class work</i>			
	Lecture	Lecture 8. Systems of econometric equations	colloquium	7
	Laboratory study	Laboratory work 4. Problems in the construction of linear multiple regression models	laboratory work	2
	<i>Independent work</i>			
Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.			
Theme 9	<i>Class work</i>			
	Lecture	Lecture 9. Dynamic econometric models		
	Practical study	Practical study 5. Systems of econometric equations	written test	6
	<i>Independent work</i>			
Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out practical homework		homework	2
Theme 10	<i>Class work</i>			
	Lecture	Lecture 10. Modeling one-dimensional time series		
	Laboratory study	Laboratory work 5. The generalized schemes of regression analysis	laboratory work	2
	<i>Independent work</i>			
Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.			
Theme 11	<i>Class work</i>			
	Lecture	Lecture 11. Learning relationships using time series		
	Practical study	Practical study 6. Modeling one-dimensional time series. Modeling one-dimensional time series	written test	6
	<i>Independent work</i>			
Questions and	Search, choice and looking through literary		homework	2

	tasks to self-study	sources on the theme. Learning the lecture material. Carrying out practical homework		
Theme 12	<i>Class work</i>			
	Lecture	Lecture 12. Factor analysis and its application to solving problems in international management	colloquium independent creative task	6 + 8
	Laboratory study	Laboratory work 6. Dynamic econometric models with lag-variables	laboratory work	2
	<i>Independent work</i>			
	Questions and tasks to self-study	Search, choice and looking through literary sources on the theme. Learning the lecture material. Carrying out a laboratory work.		
	Exam			40

Recommended reading

Main

1. Економетрика. Методичні рекомендації до практичних завдань для студентів усіх спеціальностей першого (бакалаврського) рівня [Електронний ресурс] / укл. Л. М. Малярець, О. В. Мартинова; Харківський національний економічний університет ім. С. Кузнеця. - Електрон. текстові дан. (2,72 МБ). - Харків : ХНЕУ ім. С. Кузнеця, 2020. – 81 с.

2. Економетрика [Електронний ресурс] : методичні рекомендації і завдання до самостійної роботи за темою "Проблеми в побудові лінійних множинних регресійних моделей: гетероскедастичність" для студентів усіх спеціальностей першого (бакалаврського) рівня / уклад. І. Л. Лебедева, А. В. Жуков, С. С. Лебедев. – 2019-163-ЕВ – Харків : ХНЕУ ім. С. Кузнеця, 2019. – 33 с.

3. Диха М.В., Мороз В.С. Економетрія. Навчальний посібник. – Центр навчальної літератури, 2019. – 206 с.

4. Козьменко О. В., Кузьменко О. В. Економіко-математичні методи та моделі (економетрика): Навч. посібник – Суми: Університетська книга, 2018. – 406 с., 363 р.

5. Непочатенко В.А., Дрозденко В.О., Ревиська У.С., Стригіна О.А.. Економетрика : Навчально-методичний посібник. – Біла церква, БДАУ, 2020. – 52 с

6. Greene W. Econometric Analysis. – Pearson India, 2018. – 1176 p.

7. Linton O. Financial Econometrics: Models and Methods. - University of Cambridge, 2019. – 572 p.

Additional

8. Бегун С. І. Методичні вказівки з курсу «Економетрика». – Луцьк : Друк. ПП Іванюк В. П. 2020. – 60 с.

9. Рязанцева В.В. Економетрія. Моделювання макроекономічних процесів: навч. посіб./ В.В. Рязанцева. – К.: КНТЕУ, 2018. – 388 с.

Internet Information Resources

10. Asteriou, D., & Hall, S. G. (2018). Applied econometrics. Macmillan International Higher Education. http://www.edouniversity.edu.ng/oerrepository/articles/applied_econometrics_20182019.pdf

11. Brooks, C. (2019). Introductory econometrics for finance. Cambridge university press. http://digitallab.wldu.edu.et/bitstream/123456789/580/1/Introductory_Econometrics_for_Finance__2nd_Edition%20Chris%20Brooks.pdf

12. Ukrstat.org – публікація документів Державної Служби Статистики України. [Електронний ресурс] – Режим доступу : https://ukrstat.org/uk/druk/publicat/Arhiv_u/01/Arch_Ukr_.htm

13. Державна служба статистики України [Електронний ресурс] – Режим доступу : <http://www.ukrstat.gov.ua/>

14. Освітньо-професійна програма “Міжнародна економіка” <https://www.hneu.edu.ua/wp-content/uploads/2021/07/Mizhnarodna-ekonomika-OPP-2021-bakalavr.pdf>

Methodical support

15. Сайт персональних навчальних систем: Econometrics (6.051.130), доц. Місюра Є.Ю. <https://pns.hneu.edu.ua/course/view.php?id=5623>