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

"APROVED"

Deputy head

(Vice-rector for scientific and pedagogical work)

Mykola AFANASIEV

Methods and models for forecasting processes in foreign economic activity

syllabus of the descipline

Field of knowledge	*all*
Specialty	*all*
Educational level	*Second (master's)*
Educational program	*all*

Discipline status	*selective*
Language of instruction, teaching and assessment	*English*

Head of department
*statistics and economic
forecasting*

Olena RAYEVNYEVA

Kharkiv
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The syllabus has been approved by the Department of Statistics and Economic Forecasting
Protocol № 1 on19.08.2020.

Compiled by:
Olena Rayevnyeva, D.Sc. (Economics), Professor of the Statistics and Economic Forecasting Department;
Olha Brovko, PhD (Economics), Associate professor of the Statistics and Economic Forecasting Department.

**Letter of renewal and re-approval of the syllabus
of the academic discipline**

Academic year	Date of the session of the department - developer of syllabus	Protocol number	The signature of the head of the department

Abstract of the discipline

The development of economic ties between countries, the rapid growth of the globalization process, increasing competition in the world market requires domestic enterprises to constantly implement measures to ensure the development of their foreign economic activity (FEA). The process of planning the activities of the enterprise is limited and complicated by a few objective and subjective reasons. First of all, the company does not have complete data on its current and future condition and is not able to anticipate all the changes that may occur in the environment of its operation. Even modern enterprises with powerful information systems and access to valuable sources of information are not able to completely eliminate uncertainty and, accordingly, fully plan their activities. Because the elimination of uncertainty is an impossible task due to the inability to exclude the influence of external factors, a variety of conflicting interests and actions. Uncertainty is characterized by the vagueness of the opinions and assessments used by experts, the incompleteness and inaccuracy of data on the main parameters and conditions of the forecast object.

The greatest difficulty in forecasting the foreign economic activity of the enterprise and the firm is due to the high dynamism, multifactorial nature of the formation and difficult predictability of foreign economic relations. The efficiency and probability of successful foreign economic activity depends on many factors. Therefore, there is a need to predict and plan the implementation of foreign economic activity using the methods of economic and mathematical modeling.

One of the most urgent tasks facing the leading companies engaged in foreign economic activity today is to determine the promising strategy and tactics of the company's behavior on modern software products and online technologies in order to improve the quality of management decisions.

Modeling is the main specific method used for analysis, identification of business trends. This is especially important for those enterprises and organizations engaged in foreign economic activity. Development of strategy and tactics of behavior in the markets of foreign countries is a complex structure, which requires managers to know in a timely manner the trends in the analyzed processes and forecast the main indicators of their activities in foreign markets.

The discipline "Methods and models of forecasting processes in foreign economic activity" will effectively use methods of modeling foreign economic processes, build economic and mathematical models to describe economic processes, determine the future consequences of foreign economic activity based on forecasting relevant indicators, visualize the results of calculations, modern software products and online technologies.

The object of the discipline is the economic system, which carries out foreign economic activity and processes that reflect the main areas of its life.

The subject of the discipline are methods and models of forecasting foreign economic processes and behavior of socio-economic systems.

The purpose of the discipline: acquisition by future specialists in the field of international activities of competencies for the construction and use of econometric models for evaluation, analysis and forecasting of complex socio-economic systems operating in high uncertainty and risk of both national and global market economy.

Characteristics of the discipline

Academic year	**1M**
Semester	**2**
Number of ECTS credits	**4**
Final assessment	*Pass*

Structural and logical scheme of studying the discipline

Prerequisites	Post requisites
Higher mathematics	All disciplines of professional and practical cycle
Statistics	
Computer Science	
Economic theory	All disciplines of professional and practical

Microeconomics	cycle
Macroeconomics	

Competences and learning outcomes of the study

Competences	Learning outcomes
The ability to form an adequate system of statistical indicators as an indicative research space.	Conduct an initial analysis of the information space of the study. Ability to determine and process anomalous values by forecasting methods and models. Have methods of comparing numerical series.
Ability to develop econometric models according to the real situation and analyze the adequacy of models.	Make an adequate choice of methods for assessing the economic situation, calculate the parameters of the models and check for compliance with real processes in foreign economic activity. Use appropriate criteria to analyze the level of reliability of actual and forecast estimates. Ability to choose adequate methods and models for forecasting processes in foreign economic activity.
Ability to form management decisions about the behavior of the enterprise in the national and international markets.	Understanding the essence of the tasks with the help of forecasting methods and models. Ability to model and predict the relationships between processes and phenomena in the foreign economic activity of economic entities. Ability to rationally use the obtained forecasting results in the formation of effective management decisions to correct export-oriented behavior of the enterprise.
Ability to use modern information tools and information technologies for processing and visualization of large arrays of economic data.	Ability to use PPP Excel, Statistics to process large arrays of information on export-import activities of enterprises. Ability to use modern packages for visualization and information processing.

The program of the discipline
Content module 1. General methodological aspects -economic forecasting of systems
Topic 1. Introduce to economic forecasting
Topic 2. Time series as a means of determining the trend of economic processes development
Content module 2. Forecasting methods of the economic systems
Topic 3. Forecasting of foreign economic processes based on the use of econometric models.
Topic 4. Modeling and forecasting of multidimensional processes
Topic 5. Application of specific models for forecasting the course of foreign economic processes.
Topic 6. Adaptive forecasting methods.

Teaching and learning methods
Problem lectures/questions, mini-lectures, banks of visual support and presentations. Lecture, practical, seminar, laboratory classes with the use of information technologies. Assessment methods: current control (computer testing, protection of laboratory works); modular control (modular control works); final control (pass).

The procedure for evaluating learning outcomes
The system of assessment of formed competencies in students takes into account the types of classes, which in accordance with the curriculum of the discipline include lectures, laboratory, sem-

inar, practical classes, as well as independent work. Assessment of the formed competencies of students is carried out according to the accumulative 100-point system.

The procedure for conducting current assessment of students' knowledge. Assessment of student knowledge during seminars, practical and laboratory classes is carried out according to the following criteria:

The lecture is evaluated in 2 points, from them:

1 - attendance at lectures;

1 - active participation in the discussion, answers to the lecturer's questions.

Laboratory work is estimated at 5 points, of which:

2 points - knowledge of software and computers; work with Internet resources and selection of statistical data;

2 points - the correctness of the calculations;

2 points - report and timely defense of work.

Tests are evaluated in 2 points of them:

50% correct answers - 1 point;

75% of correct answers – 1,5 points;

100% correct answers - 2 points.

Creative task (essay) is estimated at 8 points, of which:

8-7 points - the content and structure of the performed creative task correspond to the purpose of the research, the presentation of the research results is offered and analytical explanations and conclusions concerning the set tasks are given; a comprehensive study of the state of the enterprise and the definition of the necessary indicators, in accordance with the purpose of the creative task; substantiated and formed a system of socio-economic indicators on the prospects that affect the development of foreign economic activity;

6-5 points - the content and structure of the performed creative task correspond to the purpose of the research, the presentation of the research results is offered and analytical explanations and conclusions concerning the set tasks are given; a sufficient study of the state of the enterprise and the definition of the necessary indicators, in accordance with the purpose of the creative task; substantiated and formed a system of socio-economic indicators on the prospects that affect the development of foreign economic activity;

4-3 points - the content and structure of the performed creative task correspond to the purpose of the research, the presentation of research results is offered and analytical explanations and conclusions concerning the set tasks are given; a sufficient study of the state of the enterprise and the definition of the necessary indicators in accordance with the purpose of the creative task, but insufficiently correctly defined set of socio-economic indicators on the prospects that affect the development of foreign economic activity;

3-2 points - the content and structure of the creative task do not meet the purpose of the study, there are errors in the calculations.

1 point - the creative task was performed incorrectly and there is no visualization of the calculations.

Control work is estimated at 10 points, of which:

4 points - the theoretical part;

6 points - the practical part (4 points for the correctness and correctness of the problem, 2 - economic interpretation of the results).

Individual research work (IRW) is estimated at 20 points, of which:

1-3 points - a thorough description of the selected international / business process;

4-6 points - development of relevant and sound information space of the study;

7-12 points - development of economic and mathematical models with verification of results;

13-15 points - verification of results;

16-20 points - visualization of reports and intermediate results

The final grade for the discipline is calculated taking into account the points obtained during the current control of the accumulative system. A student may not be admitted to the test if the

number of points obtained as a result of the re-examination during the current control in accordance with the content module during the semester did not reach 60 points.

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

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

Rating scale national and ECTS

Total score on a 100-point scale	ECTS assessment scale	Assessment on the national scale	
		for exam, differentiated test, course project (work), practice, training	for pass
90 – 100	A	excellent	pass
82 – 89	B	good	pass
74 – 81	C	good	pass
64 – 73	D	satisfactory	pass
60 – 63	E	satisfactory	pass
35 – 59	FX	unsatisfactory	not pass

Accumulation of rating points in the discipline

Topic	Types of training		Forms of evaluation	Max points
Topic 1.	*Classroom work*			
	Lecture	The lecture reveals the following issues: 1. Forecasting as a means of predicting socio-economic processes. 2. The system of economic forecasting, its elements. 3. Principles and functions of economic forecasting. Forecasting procedure. 4. Classification of methods of economic forecasting	Attending lectures	4
	Laboratory session	Laboratory session on the topic "Formation of information space of research"	Protection of laboratory work	2
			Test tasks	2
			Protection of essay	8
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 1. Preparation for test control		
Topic 2.	*Classroom work*			
	Lecture	The lecture reveals the following issues: 1. The concept of a series of dynamics, its components. Comparison of levels of dynamic series. 2. Requirements for statistical information. Pre-processing of empirical data. 3. The average values of the levels of dynamic series and their numerical characteristics. 4. Analyti-	Attending lectures	4

		cal model of a series of dynamics. 5. Simple forecasting methods.		
	Laboratory session	Laboratory session on the topic 2. Research of patterns of development of foreign economic activity at the expense of statistical indicators	Protection of laboratory work	5
			Test tasks	2
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 2. Preparation for test control		
Topic 3	*Classroom work*			
	Lecture	The lecture reveals the following issues: 1. The concept of regression equation. The main limitations of building a regression model. 2. Construction of a one-factor regression model. Estimation of statistical significance of parameters and adequacy of the model. 3. Construction of a multifactor forecasting model. 4. Use of models with fictitious variables for forecasting foreign economic processes.	Attending lectures	4
	Laboratory session	Laboratory session on the topic "Construction of one-factor and multifactor regression model"	Test tasks	2
			Protection of laboratory work	5
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 3. Preparation for test control		
Topic 4	*Classroom work*			
	Lecture	The lecture reveals the following issues: 1. Modeling of spatio-temporal aggregates in the economy. 2. Forecasting of complex foreign economic processes by means of structural modeling	Attending lectures	2
	Laboratory session	Laboratory session on the topic: "Building models with panel data"	Protection of laboratory work	5
			Test tasks	2
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 4. Preparation for test control		
Topic	*Classroom work*			

	Lecture	The lecture reveals the following issues: 1. Study of the seasonal component of the economic process through the decomposition of time series. 2. Forecasting processes by Fourier series decomposition.	Attending lectures	4
	Laboratory session	Laboratory session on the topic "Forecasting of phenomena and processes taking into account quantitative and qualitative characteristics"	Protection of laboratory work	5
			Test tasks	2
			Control work	10
			Protection of laboratory work	8
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 5. Preparation for test control		
Topic 6	*Classroom work*			
	Lecture	The lecture reveals the following issues: 1. Features of short-term forecasting methods in foreign economic activity of enterprises. 2. Algorithmic methods of time series smoothing. 3. Forecasting using moving averages. Brown's method. Holt's method	Attending lectures	4
	Laboratory session	Laboratory session on the topic "Construction of short-term forecasting methods"	Protection of laboratory work	5
			Test tasks	2
			Protection of IRW	20
	Individual work			
	Questions and tasks for self-study	Search, selection and review of literature sources on the topic 6. Preparation for test control		

Bibliography
Main

1. Антохонова И.В. Методы прогнозирования социально-экономических процессов: Учебное пособие. –Улан-Удэ: Изд-во ВСГТУ, 2004. – 212с.

2. Бабешко Л. О. Основы эконометрического моделирования: Учебное пособие. Изд. 3-е. - М.: Ком книга, 2007. - 432с.

3. Вітлинський В.В. Моделювання економіки: навч. посібн. / В. В. Вітлинський. – К.: КНЕУ, 2003. – 408 с.

4. Геєць В. М. Моделі і методи соціально-економічного прогнозування: підручник / В. М. Геєць, Т. С. Клебанова, О. І. Черняк, А. В. Ставицький та інші.-2 вид., виправ. -Х.: ВД

«ІНЖЕК», 2008.- 396 с.

5. Єріна А. М. Статистичне моделювання та прогнозування: навч. посібн. / А. М. Єріна.– К.: КНЕУ, 2001.

6. Клебанова Т. С., Дубовина Н.А., Раевнева Е. В. Эконометрия: Учебно-методическое пособие для самостоятельного изучения дисциплины – Х.: Изд. Дом «ИНЖЭК», 2003. – 132 с.

7. Мандель И. Д. Кластерный анализ. - М.: Финансы и статистика. 1988. - 176 с.

8. Присенко Г.В. Прогнозування соціально-економічних процесів: Навч. посіб. / Г.В. Присенко, Є.І. Равікович — К.: КНЕУ, 2005. — 378 с.

9. Статистичне прогнозування та моделювання. Навч. посібник під ред. д.е.н., проф. Раєвнєвої О.В.

Additional

10. Буреева Н.Н. Многомерный статистический анализ с использованием ППП "STA-TISTICA". Учебно-методический материал по программе повышения квалификации «Применение программных средств в научных исследованиях и преподавании математики и механики». Нижний Новгород, 2007, 112 с.

11. Дюран Б., Оделл П. Кластерный анализ. Пер. с англ. Е.З. Демиденко. Под ред. А.Я. Боярского. Предисловие А.Я. Боярского. М., «Статистика», 1977. – 254 с.

12. Клебанова Т.С., Забродский В.А, Полякова О.Ю., Петренко В.Л. Моделирование экономики. Учебное пособие. – Харьков : Изд. ХГЭУ, 2001. – 140 с

13. Халафян А.А. STATISTICA 6. Статистический анализ данных. – М.: ООО «Бином-Пресс», 2008. – 512с.

14. Христиановский В.В., Щербина В.П. Экономико-математические методы и модели: теория и практика: Учебное пособие. – Донецк, 2010. – ДонНУ. – 335 с.

15. Granger C. W.J., Newbold P. Forecasting economic time series. 2nd ed. - N.Y.: Academic Press, 1986.- 324 p.

Information resources

16. Офіційний сайт Головного управління статистики в Харківській області [Електронний ресурс]. – Режим доступу: http:// uprstat. kharkov. ukrtel.net/, http://uprstat. kharkov. ukrtel.net/.

17. Офіційний сайт департаменту статистики Організації Об'єднаних Націй [Електронний ресурс]. – Режим доступу: http://unstats.un.org/unsd/default.htm

18. Офіційний сайт Державної служби статистики України [Електронний ресурс]. – Режим доступу : www.ukrstat.gov.ua.

19. Сторінка курсу на платформі Moodle (персональна навчальна система). - Режим доступу: https://pns.hneu.edu.ua/course/view.php?id=6817