Appx 2
to the Order of March 23, 2023 № 244

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Statistics and Economic Analysis

«CONFIRMED»
Dean of Faculty of Agricultural Management,
A. D. OSTAPCHUK
"____" _____ 2023

«APPROVED»
at the meeting of the department
of Statistics and Economic Analysis
Record № 12 dated on "28" April 2023
Head of Department
I.D. LAZARUSHYNA

«REWIEVED»
Program Coordinator
V.L. HERAIMOVYCH

PROGRAM OF THE COURSE

«Probability theory and statistics»

Specialty 075 "Marketing"
Educational program "Marketing"
Faculty of Agricultural Management
Developer **Olena BOHDANIUK,** Associate Professor of the Department of Statistics and Economic Analysis, PhD in Economics

Kyiv – 2023

1. Description of the course
«Probability theory and statistics»
"Module 2. Statistics"

Field of knowledge, specialty, educational program, educational degree		
Educational degree	Bachelor	
Specialty	075 "Marketing""	
Educational program	"Marketing"	
Characteristics of the course		
Type	Compulsory	
Total number of hours	90	
Number of ECTS credits	3	
The number of structural modules	2	
Course project (work) (if applicable)	_____	
Form of control	Exam	
Indicators of the course for full-time and part-time forms of study		
	Full-time form of study	Part-time form of study
Course (year of study)	1	
Semester	2	
Lecture classes	30 hours	
Practical, seminar classes	30 hours	
Laboratory classes	_____ hours	
Self-study	30 hours	
Individual assignments	_____ hours	
Number of weekly classroom hours for the full-time form of study	4 hours	

2. Purpose, tasks, and competencies of the course

Purpose: formation in students' theoretical knowledges and practical skills in statistical analysis of mass socio- economic phenomena and processes as a basis for developing and supporting management decisions that provide knowledge about method of collecting, processing and analysis, identification and assessment patterns development and interaction inherently complex socio-economic phenomena and processes.

Objectives:

- study the major categories, concepts, systems, tools and algorithms for statistics;
- acquirement practical skills solving specific statistical tasks;
- acquaintance with the scientific principles of fundamental laws of statistical techniques and methodologies;
- develop abilities of creative search the ways to improve production and business enterprises, socio-economic development with the use of key indicators, techniques and methods of statistics.

Acquisition of competencies:

General competencies (GC):

GC 4. The ability to learn and master modern knowledge.

GC 5. Certainty and perseverance regarding tasks and responsibilities.

GC 6. Knowledge and understanding of the subject area and understanding of professional activities.

GC10. Ability to communicate in a foreign language.

Program learning outcomes (PLO):

PLO 5. Identify and analyze the key characteristics of marketing systems of different levels, as well as the behavior of their subjects.

PLO 9. Assess the risks of marketing activities, establish the level of uncertainty of the marketing environment when making management decisions.

PLO 10. Explain information, ideas, problems and alternative management decision-making options to specialists and non-specialists in the field of marketing, representatives of various structural units of the market entity.

3.Structure of educational Discipline for:

– students of full-time education

Names of content modules and topics	Number of hours												
	Full-time form							Distance form					
	W	Total	including					Total	including				
			L	Sem.	Pr.	Lab	Self.s		L	Sem.	Pr.	Lab	Self.s
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Module 1. Descriptive Statistics													
Topic 1. Methodological Principles of Statistics	1	9	2		2	-	2						
Topic 2. Statistical observation	1	9	2		2	-	2						
Topic 3. Summary and clustering statistics. Statistical tables	2	9	2	-	2	-	2						
Topic 4. Generalizing statistical indicators	3	11	2	-	2	-	2						
Topic 5. Analysis of series distribution	4	6	2		2		3						
Topic 6. Concentration analysis, differentiation and similarity distributions	5	7	2	-	2		3						
Topic 7. Sampling method in management	6	7	2	-	2		3						
Total for module 1		45	14		14	-	17						
Module 2. Inferential Statistics													
Topic 8. Statistical methods for measuring correlation	7-8	17	6	-	6		5						
Topic 9. Analysis of the intensity dynamics	9-10	13	4	-	4		2						
Topic 10. Time Series	11-12	9	2	-	2		2						
Topic 11. Index method in management	13	9	2	-	2		2						
Topic 12. Statistical Graphics in management	14	9	2	-	2		2						
Total for module 2	15	45	16	-	16		13						
Total sum	15	90	30		30		30						

4. Topics of seminars
5. Topics of practical classes

№	Name of Topics	Quantity of hours
1	Object of Statistics, its main category. Statistical methodology.	2
2	Statistical observation as method of information providing. Program-methodology questions of statistical observation. Organize questions of statistical observation. Forms, kinds and methods of observation.	2
3	Essence of statistical bunching, classification and grouping. Principles of forming groups. Statistical tables.	2
4	Essence and kind of statistical indexes Absolute statistical value. Relative values. Average indexes. System of statistical indexes.	2
5	Distribution regularity. Variation characteristic. Characteristic of distribution forms.	2
6	Characteristic of distribution center. Kinds and interconnection of dispersion.	2
7	Of sampling method. Sampling values of average and share. Sampling kinds. Statistical verification of hypothesis.	2
8	Types of interconnections. Regression analysis. Value of tightness and verification of the essence of correlation connection. Rang correlation. Conformity value of attributive rows variation.	2
9	Essence and compound elements of dynamic row. Characteristics of dynamic intensity. Average absolute and relative speed development	2
10	Characteristics of main tendency of development. Value of fluctuation and dynamic constancy. Correlation of dynamic row.	2
11	Essence and functions of indexes. Methodological bases of bunching indexes structure. Aggregate form of indexes and average weighted indexes. Interconnection of indexes. Average indexes.	2
12	Role and meaning of graphical method. Main elements of graphics. Rules of structure of statistical graphs. Kinds of statistical graphs.	2
13	Object, tasks and system of statistics for crop production indexes. Statistics of area under crop. Statistics of gross yield of agrarian cultures. Statistics of perennial crops. Statistics of agro-technic. Modern organize of statistical crop production observation in Ukraine.	2
14	Object, tasks and system of statistics for animal husbandry. Statistics of quantity and structure of agrarian animals. Indexes of movement and reproduction of animals. Natural indexes of livestock production. Statistics of zootechnic measures. Modern organize of statistical observation of livestock in Ukraine. Main directions and methods of economic-statistical analysis about pattern and development of animal husbandry.	2
15	Statistics of fixed assets. Statistics of production and energetic equipment. Statistics of productivity and remuneration. Statistics of agricultural production efficiency.	2
Total		30

6. Topics of lab classes

7. Topics of self-study

№	Name of Topics	Quantity of hours
1	Methodological Principles of Statistics	2
2	Statistical observation	2
3	Summary and clustering statistics. Statistical tables	2
4	Generalizing statistical indicators	2
5	Analysis of series distribution	3
6	Concentration analysis, differentiation and similarity distributions	3
7	Sampling method	3
8	Statistical methods for measuring correlation	5
9	Analysis of the intensity dynamics	2
10	Time Series	2
11	Index method	2
12	Statistical Graphics	2
Total		**30**

8. Samples of control questions, tests for assessing the level of knowledge acquisition by students.

1. Types of relationships between phenomena. Functional and correlation.
2. The concept of correlation-regression analysis. The main tasks of correlation analysis. Prerequisites for correlation analysis. Types of correlations by form and direction of communication.
3. Analysis of simple linear correlation. Construction of the regression equation. Method of calculating the parameters of the regression equation. Economic content of regression coefficients.
4. Indicators of assessment of closeness of communication. Correlation index. Linear correlation coefficient. Coefficient of determination.
5. Analysis of simple nonlinear correlation. Method of calculating the parameters of the regression equation. Correlation index. Coefficient of determination.
6. Analysis of multiple correlation. Method of calculating the parameters of the regression equation. Economic content of partial regression coefficients. Paired, partial and multiple correlation coefficients. Partial and multiple coefficients of determination.
7. Nonparametric correlation analysis.
8. Statistical time series, their constituent elements. Instantaneous and interval time series. Rules for constructing time series.
9. Indicators of time series. The average level and methods of its calculation. Absolute growth. Growth rate. The value of one percent increase. Methods of calculating the dynamics. The basic way. Chain method. Relationships between performance indicators.
10. Average levels of a number of dynamics.

11. Methods of identifying development trends. The method of enlarged intervals. Moving average method. Analytical alignment of time series by the method of least squares. Interpolation. Extrapolation.

12. The concept of indices. The value of indices in economic analysis. Types of indices. Individual and general indices. The main elements of general indices. Indexed values. Weights and coefficients of proportionality. General aggregate indices. Principles of construction of general aggregate indices. The main tasks solved with the help of indexes.

13. Index system for characterizing the dynamics of a complex phenomenon. Basic and chain indices.

14. The role and significance of statistical graphs. The main elements of the statistical graph. Graph field. Geometric signs. Spatial landmarks. Large-scale landmarks. Explication of the schedule.

15. Types of statistical graphs. Charts. Cartograms. Card diagrams.

Types of diagrams and methods of their construction.

16. Tasks of crop statistics.

17. Tasks of statistics of sown areas. The main features of the classification of sown areas of crops and their groups. Indicators of the size and composition of sown areas. Accounting categories of sown areas and their economic significance.

18. The subject and objectives of gross harvest and yield statistics. Yield and yield indicators. Average yield by groups of homogeneous crops. Statistical estimation of crop losses. Index analysis of gross harvest and crop yields.

19. Tasks of agricultural technology statistics. Classification of agro technical measures. System of indicators of agricultural engineering statistics.

20. The main tasks of statistics of perennial plantations. Classification of perennial plantations. System of statistical indicators of perennial plantations.

21. Tasks of livestock statistics. Indicators of the number and composition of livestock. Indicators of movement and reproduction of livestock.

22. Indicators of livestock products and methods of their calculation.

23. Indicators of livestock productivity and methods of their calculation.

24. The main indicators of statistics of zoo technical measures.

25. Types of accounting for products in agriculture and their importance.

26. Types of valuation of agricultural products.

27. Statistical analysis of the efficiency of agricultural production.

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENT SCIENCES OF UKRAINE

"Bachelor" **specialty** "Marketing"	Statistics and economic analysis department	EXAMINING Ticket number the discipline «Probability theory and statistics»	**Approved** Chief of Department of Statistics and Economic Analysis _____ (signature) prof. I.D.Lazarushuna "_____" _____

Examination task

I. Problem

The level of profitability of Light Industry is characterized by data (Table).

Define: *average profitability by points*

Return%	Up to 6	6 - 11	11 - 16	16 - 21	21 - 26	26 -31	31 or more
number of companies	7	11	16	21	27	13	5

Second. Theoretical questions

Defining statistical series distribution of graphic.

III. Tests

Question 1. The total physical production of canned food in the Ukraine may be expressed in units ...
1. costly
2. natural
3. conditional-natural
4. temporary

Question 2. Frequency - it ...
1) the number of mass phenomena in comparable collections;
2) the number (quantity) unit discrete number of signs identical size or number of units interval interval series;
3) the number of uniform statistical population;
4) quantitative value to rank number distribution.

Question 3. What will be the coefficient of variation, knowing that when examining 20 companies dispersion rape yield is 17.3, average - 24.5
1. 70.61%
2. 38.84%
3. % 16.98
4. 15.30%
5. 0.44

Question 4. Which feature shared by statistical observations on current, periodic and disposable?
1. As the requirements for organizational forms of surveillance
2. By the time of observation
3. With a time of receipt of data from statistical reports of enterprises
4. From a statistical accounts

Question 5. Which formula is calculated variance method of moments?	
1.	2.
3.	4.
5.	

Question 6. Why a median interval equal number of distribution:	
The yield of buckwheat, kg / ha	number of companies

12-16	4
16-20,	5
20-24	6

Question 7. Name the properties of linear correlation coefficient:

r >0; r <0; r → 0; r → 1; r = 0; r = 1

Question 8. In determining the required sample size should be given the following conditions:	
1.	marginal error rate variations in level trust probability
2.	variance, averaged level trust probability
3.	the size of the average error, coefficient of variation, the amount of the population
4.	the amount of the population, the relative intensity value, average

Question 9. Install accordance ways to identify trends time series:

1. The absolute level of a number of speakers for short intervals undergo random fluctuations, replacing summar y value for a longer period	A) consolidation periods B) analytical alignment B) moving average
2. The average aggregated periods established each successive entry-level exception interval and replacing it with another number next level	
3. The calculation parameters of a mathematical equation which describes trends in a number of	

Question 10. How is the index obtained by the equation: ?

9. Teaching methods

Practical	Visual	Verbal	Working with book	Video- method
Experiments, exercises, training and productive work	Illustrations, demonstration, observation of students	Explanation, explanation, narration, conversation, instruction, lecture, discussion, debate	Reading	Viewing, Training, Exercises under the supervision of "electronic teacher" control

10. Forms of assessment

Control measures include current and final evaluation of student knowledge. Current control is carried out during practice and in the process of self-study in the following areas: rapid surveys, tests, tasks "right-wrong" problem.

11. Distribution of grades received by students

Evaluation of student knowledge is carried out on a 100-point scale and is converted to national grades according to Table 1 "Regulations and Examinations and Credits at NULES of Ukraine" (order of implementation dated 03.03.2021, protocol №7)

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

In order to determine the rating of a student (listener) in the discipline $\mathbf{R_{dis}}$ (up to 100 points), the rating from the exam $\mathbf{R_{ex}}$(up to 30 points) is added to the rating of a student's academic work $\mathbf{R_{aw}}$ (up to 70 points): $\mathbf{R_{dis} = R_{aw} + R_{ex}}$ **.**

12. Educational and methodological support

1. Regulations.
2. Complex teaching of the discipline.
3. Methodological guidelines for independent study courses.
4. Methodological guidelines for writing a Project paper.
5. https://elearn.nubip.edu.ua/course/view.php?id=2165

13. Recommended literature

Main

1. Горкавий, В. К.·Статистика: Навчальний посібник. Київ: Алерта, 2018. 608 с.

2. Заєць С.В., Томіленко В.М. Статистика [Текст] = Statistics: підручник. Держ. фіскал. служба України, Нац. ун-т держ. податк. служби України. Ірпінь: Вид-во Нац. ун-ту ДПС України, 2016. 510 с.

3. Костюк В.О., Мількін І.В. Статистика. Навчальний посібник. Х.:ХНУМГ ім. О.М. Бекетова, 2016. 114 с.

4. Економічна статистика [Текст]: метод. вказівки до виконання розрахунк. роботи для студентів галузі знань "Управління та адміністрування" спец. 073 "Менеджмент" / Нац. техн. ун-т України "Київ. політехн. ін-т ім. Ігоря Сікорського" ; [уклад. Л. П. Шендерівська ; відп. ред. А. В. Кваско]. - Київ : КПІ ім. І. Сікорського : Політехніка, 2017. 46 с.

Additional

5. Білоцерківський О.Д. Теорія ймовірностей і математична статистика [Текст] : практикум для студентів спец. 076 "Підприємництво, торгівля та біржова діяльність". Нац. техн. ун-т "Харків. політехн. ін-т". Харків: Друкарня Мадрид, 2018. 169 с.

6. Бідюк П.І. Математична статистика [Текст]: навч. посіб. Міжрегіон. Акад. упр. персоналом. Київ: Персонал, 2017. 347 с.

7. Богданюк О.В. Статистика. Курс лекцій та індивідуальні завдання для студентів спеціальності «Облік і оподаткування». Частина 1. К.: Компринт, 2017. 234 с.

8. Гаркуша Н.М. Соціально-економічна статистика [Текст]: навч. посіб. Харків. держ. ун-т харчування та торгівлі. - 3-тє вид., випр. і допов. Харків : ХДУХТ, 2017. 374 с.
9. Математична статистика [Текст] : навч. посіб. / [Є. О. Лебєдєв та ін.] ; Київ. нац. ун-т ім. Тараса Шевченка. Київ : Київський університет, 2016. 159 с.
10. Завдання до самостійної роботи з навчальної дисципліни "Статистика" для студентів усіх напрямів підготовки денної форми навчання [Текст] / Харків. нац. екон. ун-т ім. Семена Кузнеця ; [уклад.: О. В. Раєвнєва та ін.]. Харків : ХНЕУ ім. С. Кузнеця, 2016. 51 с.
11. Економічна статистика [Текст]: навч. посіб. / [В. М. Соболєв та ін.; за ред. В. М. Соболєва]; Харків. нац. ун-т ім. В. Н. Каразіна. Харків: ХНУ ім. В. Н. Каразіна, 2017. 386 с.
12. Статистика. Конспект лекцій [Текст]: навч. посіб. / Кам'янець-Поділ. нац. ун-т ім. Івана Огієнка, Екон. ф-т, Каф. упр. персоналом та економіки праці; О. В. Рарок [уклад.]. Кам'янець-Подільський : Сисин Я. І. [вид.], 2017. 201 с.
13. Ющенко Н. Л. Статистика [Текст]: навч. посіб. Черніг. нац. технол. ун-т. Чернігів: Десна Поліграф, 2018. 343 с.
14. Shyriaieva, Natalia. Statistics. Basic principles [Text]: lecture notes on Statistics course for students of bachelor level in 6.030601 Management and 6.030508 Finance and credit / Natalia Shyriaieva ; Нац. техн. ун-т "Харків. політехн. ін-т" = Статистика. Основні принципи : текст лекцій з курсу "Статистика" для студентів напрямів 6.030601 "Менеджмент" та 6.030508 "Фінанси і кредит" / Наталя Ширяєва. - Харків : Вид-во Іванченка І. С., 2018. 161 с.