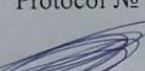


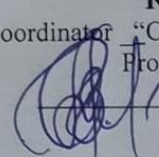
**NATIONAL UNIVERSITY
OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE**

Department of Statistics and Economic Analysis

"CONFIRMED"
Dean of the Economic faculty,

" 30 " 2023


"APPROVED"
at the meeting of the Department
of Statistics and Economic Analysis
Protocol № 12 from "28" April 2023

Head of the Department
Inna Lazaryshyna

"REVIEWED"
Program Coordinator "Corporate finance"

Program Coordinator
Yulia Bilyak

PROGRAM OF THE COURSE

"Statistics"

Specialization 072 "Finance, banking, insurance and stock market"
Educational program "Corporate finance"
Economic Faculty
Developers: Oksana Makarchuk, Associate Professor of the Department of Statistics and
Economic Analysis, PhD in Economics

Kyiv – 2023

1. Description of the discipline STATISTICS

Field of knowledge, specialization, educational program, educational degree		
Educational degree	<i>bachelor</i> (Bachelor's, Master's)	
Specialization	072 “Finance, banking, insurance and stock market” Code and Name of specialization	
Educational program	<u>Corporate finance</u> Name of program	
Characteristics of the course		
Type	Compulsory	
Total number of hours	150	
Number of ECTS credits	5	
Number of content modules	4	
Course project (work) (if applicable)	Course project	
Form of assessment	Credit, 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)	1-2	
Semester	2,3	
Lecture classes	75 hr.	hr.
Practical, seminar classes	75 hr.	hr.
Laboratory classes	hr.	hr.
Self-study	hr.	hr.
Individual assignments	hr.	hr.
Number of weekly classroom hours for the full-time form of study	6 hr.	

2. Purpose, objectives, and competencies of the course

Purpose The main purpose of the study course “Statistics” is the formation in students theoretical knowledge’s and practical skills in statistical analysis of mass socio- economic phenomena’s 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’s and processes.

Tasks: 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.

As a result of studying the discipline the student should **know:** patterns, principles and common methods of statistical studies; stages of statistical analysis of primary data and summarize the results; analysis mechanisms and synthesis of statistical data and statistic indicators; methods for studying relationships between phenomenon's occurring in the community and be able to describe the results of research; ways of transition from studying statistical methods to the elements of factor analysis to identify reserves of improvement of result indexes; methods for evaluating contemporary issues of social-economic development and production and business enterprises; statistical methodology for determining the effects of management decisions on the activity of enterprises; features of practical application of statistical methods for the study of mass phenomena and processes that occurring in agricultural production.

be able to: use appropriate methods to study the phenomena; use Microsoft Excel for data analysis; describe getting results; forecast researched phenomena of process.

Acquisition of competencies:

Integrated competencies (IC): Ability to solve complex specialized tasks and practical problems in the field of finance, banking and insurance in the course of professional activity or in the process training, which involves the use of certain methods and provisions of financial science and is characterized uncertainty of conditions and the need to take into account the complex requirements for professional and educational activities

General competencies (GC):

GC 02. Ability to apply knowledge in practical situations

- GC 04. Ability to communicate in a foreign language.
- GC 05. Skills of using information and communication technologies.
- GC 07. Ability to learn and master modern knowledge.
- GC 08. Ability to search, process and analyze information from various sources.
- GC 10. Ability to work in a team.

Professional (special) competencies (PC):

- PC 01. The ability to research trends in the development of the economy due to macro- and microeconomic tools analysis, evaluate modern economic phenomena.
- PC 03. Ability to diagnose the state of financial systems (state finances, including budget and tax systems, finances of economic entities, finances households, financial markets, banking system and insurance).
- PC 04. Ability to apply economic and mathematical methods and models for solving financial problems.
- PC 06. The ability to use modern information and software for receiving and processing data in the field of finance, banking and insurance.
- PC 10. Ability to define, justify and take responsibility for professional decisions.
- PC11. The ability to maintain an appropriate level of knowledge and constantly improve their professional training.

Program learning outcomes (PLO):

- PLO 06. Apply relevant economic and mathematical methods and models for solving financial problems.
- PLO 08. Apply specialized information systems, modern financial technologies and software products.
- PLO 09. Form and analyze financial statements and correctly interpret the received information.
- PLO 10. Identify sources and understand methodology definition and methods of obtaining economic data, collect and analyze the necessary financial information, calculate indicators characterizing the state financial systems.
- PLO 11. To have methodical tools for implementation control functions in the field of finance, banking and insurance.
- PLO 13. To have general scientific and special methods of researching financial processes.
- PLO 16. Apply acquired theoretical knowledge for solving practical tasks in a meaningful way interpret the obtained results.

3. Program and structure of the course for:

- complete full-time form of education.

**The programme of the discipline
STATISTICS**

The names of the modules and themes
Module 1 <u>Steps statistical observation and analysis techniques patterns of distribution</u>
Theme 1. Methodological Principles of Statistics
Theme 2. Statistical observation
Theme 3. Compilation and grouping (bunching) of statistical data. Statistical tables
Theme 4. Analysis of the forms of statistical series distribution and their graphical representation
Theme 5. Generalizing statistical indicators
Theme 6. Analysis of variation
Theme 7. Forms of statistical distribution
Module 2 <u>Methods of statistical analysis</u>
Theme 8. Sampling method
Theme 9. Statistical methods for measuring correlation
Theme 10. Time series and their analysis
Theme 11. Analysis of trends and fluctuations
Theme 12. Statistical tables and graphs
Module 3 <u>Statistics of Agriculture and Environment</u>
Theme 13. Subject and method of agricultural statistics
Theme 14. Index Analysis
Theme 15. Crop statistics
Theme 16. Livestock statistics
Theme 16. Livestock statistics
Theme 17. Statistics of production resources and efficiency of agricultural production
Module 4 <u>Basic economic statistics</u>
Theme 18. Statistics of agricultural products
Theme 19. Statistics of market goods and services
Theme 20. Finance statistics
Theme 21. Price and inflation statistics
Theme 22. Statistics of investments and securities

Theme 1. Methodological Principles of Statistics

General knowledge about statistics. A brief history of the development of statistics. The object of study of statistics.

Basic concepts of statistical science. Statistical population. Statistical totality in public life and their characteristics. Statistical pattern. Statistical indicators. The

content, size and shape of the statistical indicators. The system of statistical indicators.

The theoretical basis of statistics. Statistics and other sciences. Statistics and Mathematics. Statistics and Accounting.

Method of Statistics. Philosophy is the methodological basis of statistics. Features of the statistical method.

Statistics as multidisciplinary science. Stages of statistical analysis, their unity and relationship.

Organization of Statistical Service. The task of Statistics of Ukraine. Law of Ukraine "On State Statistics".

Theme 2. Statistical observation

The concept of statistical observation. Plan of the statistical observation. The task of observation. The object and the unit of observation. Observation program. Statistical tools of observation. Organization of the statistical observation. Place, time, and time of observation. The preparatory to work. Unified State Register of Enterprises and Organizations of Ukraine.

Organizational forms of survey: reports, specifically organized surveys and registries.

Types of statistical observations on the degree of coverage of units and time data registration. Types of the no continuous observation.

Methods of statistical observation.

Errors of statistical observation and methods for their detection. Receipt and control of materials the statistical observation.

Theme 3. Compilation and grouping (bunching) of statistical data. Statistical tables

The task of summary, its content. The organization of reports. Types of summary. Simple and complex construction. Centralized and decentralized summary.

Statistical grouping – scientific basis for processing mass data. The sense of the grouping method. Objectives and types of groupings. Types of grouping signs. Sequence of grouping. Deviation on groups and intervals.

Secondary grouping.

Statistical tables. The constituent elements of the table. Types of tables. The guidelines for preparing tables.

Theme 4. Analysis of the forms of statistical series distribution and their graphical representation

The concept of the statistical distribution rows. Types of rows distribution and their components. Graphic representation of the distribution rows.

Structural characteristics of the average as a distribution center.

Mode. Methods for computing mode in discrete and interval rows distribution. Multimode's distributions.

Median. Methods for calculating the median in a discrete and interval rows distribution. Bimodal row distribution.

The ratio between the arithmetic mean, the mode, the median in row distributions.

Quartiles, deciles, percentiles.

Theme 5. Generalized of statistical data

Types of statistical general indexes. Conditions of the scientific use of absolute and relative indexes.

Absolute indicators and their types. Measurement units of absolute indexes.

Types of relative indexes, their forms and measurement units.

The concept of average. Conditions of averages use and implementation. Types of averages. Methods for calculating the different types of averages. Majorant rule.

Arithmetic average, methods of its calculation. The simple and weighted arithmetic average. Justification weight for the weighted arithmetic mean.

Mathematical properties of the arithmetic mean. Calculation the arithmetic mean by the method of moments.

A combination of averages to the method of statistical groupings in economic analysis. General and group averages.

Theme 6. Analysis of variation

Variation indicators. The scale of variation. The average linear deviation. Mean square deviation (variance). Standard deviation. Coefficient of variation. Methods for calculation indexes of variation for grouped and non grouped data.

Mathematical properties of the dispersion. Calculation the variance by the method of moments.

Rule of adding the dispersion and its application.

Specifications of form distribution, methods of its calculation. The concept of normal distribution.

Theme 7 . Forms of statistical distribution

Concentration. Methods of assessing the degree of concentration. Concentration factor.

Localization factor and its characteristics.

Coefficient of similarity structures, methods of its calculation.

Indicator of the intensity of structural changes. Linear coefficient of structural changes. Quadratic rate of structural changes.

Theme 8. Sampling method

General and sample. The task of sampling observation. The concept of statistical evaluation. Basic requirements for statistical aggregates.

Organization of the sample observations. The combination of continuous and selective monitoring. The use of sampling method in social-economic statistics.

Methods of selecting, that ensuring representativeness of the sample. Random selection. Mechanical selection. A typical selection. Serial selection. The combination of different methods of selection.

Sampling error. The average sampling error. Limiting sampling error. Point and interval estimates of parameters of the population. Methods of statistical evaluation of the arithmetic mean and proportion. Determination of sampling error for the different methods of selection.

Determining the required number of samples.

Theme 9. Statistical methods for measuring relationships

Types of relationships between phenomenas. And functional and correlation relationships.

Analytical method of grouping.

Analysis of variance.

The concept of correlation and regression analysis. The main objectives of the correlation analysis. Prerequisites of the correlation analysis. Types of correlation dependencies in form and direction of connection.

Analysis of simple linear correlation. Building a regression equation. Method of calculating the parameters of the regression equation. The economic meaning of the regression coefficients. Indexes of tightness of connections. Index correlation. The linear correlation coefficient. Coefficient of determination.

Analysis of a simple non-linear correlation. Method of calculating the parameters of the regression equation. Index of correlation. Coefficient of determination.

An analysis of multiple correlation. Method of calculating the parameters of the regression equation. The economic content of the partial regression coefficients. Paired, partial and multiple correlation coefficient. Partial and multiple coefficients of determination.

Non-parametric correlation analysis.

Correlation analysis of quality traits.

Theme 10. Time series and their analysis

Statistical time series and their components. Moment and interval, parallel and interrelated time series. Terms of constructing time series.

Indicators of time series. Intermediate level and methods of its calculation. Absolute growth. Growth. Growth rate. The value of one percent increase. Methods for calculating the dynamics. Basic method. Chain method. The relationship between the dynamics .

Average levels of row series.

Methodology for calculation indexes of the intensity of the phenomena that are characterized by two dynamic series. Coefficient of advance. Absolute acceleration (deceleration) growth. Factor of acceleration (deceleration) relative to speed of dynamics.

Transformation of time series. Closing time series. Bringing together time series to one basis.

Theme 11. Analysis of trends and fluctuations

Methods for detecting trends. Method of aggregated intervals. Moving average method. Analytic equating of time series by the method of least squares. Interpolation. Extrapolation.

Analysis of seasonal fluctuations. Indices of seasonality. Seasonal wave. The average coefficient of seasonality.

Theme 12. Statistical tables and graphs

The role and importance of statistical tables and graphs. Key elements of statistical graphics. Field of the graphic. Geometric signs. Spatial orientations. Large-scale benchmarks. Explication of graph.

Types of statistical graphs. Diagrams. Cartogram. Cartodiagram.

Chart types and methods of their construction.
Methods of graphic representation of the dynamics of the phenomena, the structure of the relationship.

Theme 13. Subject and method of agricultural statistics

The subject of agricultural statistics. Special attention is paying to the inconsistency of the working period with the time of production, as well as seasonal changes in climatic conditions is the main reason for the seasonality of agricultural production, especially in agriculture.

Method of agricultural statistics. Statistical research in agriculture, like any, consists of three successive stages, which detailed are analyzed: statistical observation; compilation and grouping of statistical observation data; analysis of the obtained results and formulation of conclusions.

The system of statistical indicators in agriculture.

Theme 14. Index Analysis

The concept of the indexes. Index values in economic analysis. Types of indexes. Individual and general indexes. Key elements of the generalized indexes. Indexed value. Balance and proportionality factors. General aggregate indexes. Principles of total aggregate indices. The main tasks to be solved by using indexes.

The system indexes for characterize the dynamics of complex phenomena. Basic and chain indices.

Arithmetic and harmonic indices. The principles of their construction.

Indices of average. Indices of variable composition, of permanent, structural changes.

Index analysis method. Assessing the impact of individual factors on changing complex phenomenas based on interrelated indices.

The regional indices.

Theme 15. Crop Statistics

Task of the crop statistics. Indicators of the presence and composition of the land fund by categories of land users and land types. Indicators, condition, quality and use land resources.

Modern statistical organization of land use and land in Ukraine.

Task of statistics of crop area. The main features of the classification of crop areas of agricultural cropping and their groups. Indicator of the size and composition of the crop area. Accounts category of sowing area and their economic importance.

Subject and task of statistics of collection and gross yield. Indicators of output and yield. The average yield by groups of homogeneous cultures. Statistical evaluation of yield losses. Index Analysis of gross yield and crops yield.

Task of statistical agricultural technology. Classification of farming practices. System performances of statistical farming.

The main task of Statistics perennial plants. Classification of perennial plants. The system of statistical indicators of perennial plants.

The current organization of crop statistics.

Theme 16. Livestock Statistics

Task of the livestock statistics. Indicators of the size and composition of livestock. Indexes of movement and reproduction of cattle.

Indicators of animal products and methods of their calculation.

Indexes of cattle productive and methods of their calculation.

Key performance of statistics zootechnical measures.

Main types and methods of economic – statistical analysis and development of animal husbandry.

Theme 17. Statistics of production resources and efficiency of agricultural production

Task of statistics of inputs and agricultural production efficiency.
Classification of fixed assets in agriculture.

Indicators of the presence, composition, movement and use of assets.
Methods for evaluation of fixed assets.

Indexes of statistics of energy resources.

Indicators of availability and use of machines working in agriculture.

Main indicators of labor force statistics. Indexes of labor use and working hours. Indexes labor productivity and payment in agriculture, method of their calculation and analysis.

Indicators of production costs and production price. Indicators of income and profitability of production. Analysis of data on cost products, revenue and profitability of production.

Theme 18. Statistics of agricultural products

Subject and task of agricultural products. Gross product of agriculture is scrutinized. The main tasks of agricultural products statistics are studied.

Gross product, its composition and methods of determining. Two methods of gross agricultural products are scrutinized: 1) the method of gross turnover; 2) the method of final products.

The indexes of GDP is studied, where distinguish nominal and real GDP.

Estimation of gross output.

Indicators of income and profitability.

Theme 19. Statistics of market goods and services

Subject of market statistics and services. Basic concepts and classifications. Functional tasks of market statistics.

The system of indicators is based on the main economic and social categories of the market. These include: goods, supply, demand, price, turnover, inventory, fixed assets, turnover costs, profit from sales of goods.

Statistics of commodity flows.

Statistical monitoring of commodity market conjuncture.

Theme 20. Finance statistics

Subject, method and objectives of financial statistics. General scientific principles, laws and categories used in statistics find concrete expression in statistical methods and techniques, which include methods of statistical grouping, classification, generalized indicators (absolute, relative and average values, indicators of variation), sample observation, statistical techniques. Time series data processing, index, correlation and regression analysis methods, balance sheet method and specific analysis methods used in cash flow analysis.

In addition, concepts and categories of financial theory and probability theory and mathematical statistics are used.

State budget statistics.

Money circulation statistics.

Credit statistics.

Theme 21. Price and inflation statistics

The essence and types of prices are scrutinized.

Indicators of the level and structure of prices. Peculiarities of studying the structure in price statistics are the analysis of the number and role of intermediaries in the formation of retail prices, for example, by indicators such as: the coefficient of link promotion of goods, the share of state revenues from taxation of intermediary activities.

Indicators of price dynamics and inflation. Special attention are paying to Paashe and Laspeyres.

Theme 22. Statistics of investments and securities

Base of investment and securities statistics. The task of investment statistics is to develop methods and study students to do quantitative analysis of problems related to long-term and short-term loans and borrowings,

terms of their receipt and repayment, making various periodic payments, as well as problems of assessing financial risks, efficiency of financial transactions and more.

Methods of investment and securities statistics are scrutinized.

STRUCTURE OF THE DISCIPLINE STATISTICS

[illegible]

Topic 21. Price and inflation statistics	1	4	2	2									
Topic 22. Statistics of investments and securities	2	8	4	4									
Total for the module 4	8	32	16	16									
Total hours		150	75	75									
Course project from Statistics													
Total hours		150											

4. Seminar topics

Curriculum is not provided this type of work.

5. Practical class topics

№	Name of Themes	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.	3
3	Essence of statistical bunching, classification and grouping. Principles of forming groups. Statistical tables.	4
4	Analysis of the forms of statistical series distribution and their graphical representation	2
5	Essence and kind of statistical indexes. Absolute statistical value. Relative values. Average indexes. System of statistical indexes.	4
6	Distribution regularity. Variation characteristic. Characteristic of distribution forms.	4
7	Characteristic of distribution center. Kinds and interconnection of dispersion.	4
8	Sence of sampling method. Sampling values of average and share. Sampling kinds. Statistical verification of hypothesis.	4
9	Kinds of interconnections. Regression analysis. Value of tightness and verification of the essence of correlation connection. Rang correlation. Conformity value of attributive rows variation.	6
10	Essence and compound elements of dynamic row. Characteristics of dynamic intensity. Average absolute and relative speed development	4
11	Characteristics of main tendency of development. Value of fluctuation and dynamic constancy. Correlation of dynamic row.	4
12	Role and meaning of graphical method. Main elements of graphics. Rules of structure of statistical graphs. Kinds of statistical graphs.	4
13	Subject and method of agricultural statistics	2
14	Essence and functions of indexes. Methodological bases of bunching indexes structure. Aggregate form of indexes and average weighted indexes. Interconnection of indexes. Average indexes.	4
15	Object, tasks and system of statistics for crop production indexes.	2

	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.	
16	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
17	Statistics of production resources and efficiency of agricultural production	4
18	Statistics of agricultural products	2
19	Statistics of market goods and services	4
20	Finance statistics	4
21	Price and inflation statistics	2
22	Statistics of investments and securities	4
Total		75

6. Laboratory class topics

Curriculum is not provided this type of work.

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

1. What is the subject of statistics?
2. Name the fundamental differences that are emphasized in the definition of the subject of statistics.
3. Why do statistics study only mass social phenomena and processes?
4. What is the essence of the law of large numbers?
5. What is called a statistical indicator?
6. Explain the concept of statistical regularity.
7. What is a statistical population, a unit of population?
8. What is called a sign of the totality? Name the types of signs.
9. Name examples of quantitative and attributive features for the statistical population of students.
10. What feature is called variable?
11. Classification of scales of signs.
12. Name the stages of statistical research.
13. What is the theoretical basis of statistics?
14. What methods of statistics do you know?
15. What is statistical observation, what is its essence?
16. Name the organizational forms of statistical observation.
17. What is the essence of reporting?
18. What is a specially organized statistical observation?
19. What types of specially organized statistical observations do you know?
20. What issues are included in the program-methodological and organizational part of the plan?
21. What is an object and a unit of observation?

22. What is a statistical observation program?
23. Name the types of statistical observation of the degree of coverage of population units.
24. Name the types of statistical observation of facts over time.
25. Methods of observation.
26. What are the errors of statistical observation? What types of errors do you know?
27. What is the logical and arithmetic control of observation materials.
28. What is a compilation of statistics? What types of reports do you know?
29. What is a statistical grouping?
30. Name the types of groupings, their essence.
31. Name examples of analytical grouping.
32. In what sequence is the grouping?
33. How to determine the number of groups in groups by attribute?
34. How to determine the number of groups in groups on a quantitative basis?
35. How to determine the step interval?
36. What are the intervals?
37. What is a secondary grouping?
38. In which cases use the secondary grouping?
39. What is a statistical table?
40. What are the elements of a statistical table?
41. What are the tables for the construction of the subject?
42. Name the rules for constructing tables.
43. What are the absolute values?
44. Name the units of absolute values?
45. What is a relative value?
46. Describe the types of relative quantities.
47. In what units are measured relative values?
48. What is the average value?
49. Name the types of averages.
50. Name the conditions for the use of averages.
51. In which cases the arithmetic mean is used, formulas for its calculation.
52. In which cases the harmonic mean is used, formulas for its calculation.
53. In which cases the geometric mean is used, formulas for its calculation.
54. In which cases the rms is used, the formulas for its calculation.
55. Name the mathematical properties of the arithmetic mean.
56. What is the essence of the method of moments?
57. What is a distribution series?
58. Name the types of distribution series.
59. Name the elements of the variational series of distribution.
60. What is the density of distribution?
61. What is a landfill, histogram?
62. In which cases use cumulate and ogive?
63. Name the characteristics of the center of the distribution series.
64. What are quartiles and deciles?
65. What indicators are used to measure variation?
66. What indicator is used to compare the variation of two or more features of one set, or variations of the same feature in different sets?
67. Name the mathematical properties of the variance.
68. What are the different types of variance?
69. What is the essence of the rule of adding variance?
70. What is the correlation?
71. What distributions are symmetric, asymmetric.
72. What indicators are used to determine the degree of asymmetry and sharpness?

73. What is concentration?
74. What characterizes the concentration ratio?
75. What is the value of the concentration factor with a uniform distribution?
76. What is the peculiarity of calculating the localization factor?
77. What is the value of the localization coefficient with a uniform distribution?
78. What is the similarity coefficient?
79. What indicators characterize the intensity of structural changes?
80. What is selective observation?
81. What are the schemes for selecting units in the sample?
82. What do you know the types of selection of units in the sample?
83. What is the sampling error?
84. Is there a difference in determining the average sampling error for re- and non-re-sampling?
85. What is the confidence factor?
86. How to determine the marginal sampling error for the mean and fraction?
87. What determines the sample size?
88. What connection is called functional?
89. What relationship is called correlation?
90. What is the essence of analytical grouping?
91. What characterizes the correlation?
92. Name the main tasks of correlation-regression analysis.
93. Name the prerequisites for the use of correlation-regression analysis.
94. What is the regression equation?
95. How to calculate the parameters of the linear regression equation?
96. What indicators are used to assess the tightness of the relationship in the correlation-regression model?
97. What are the coefficients of elasticity?
98. How to check the significance of regression coefficients?
99. How to check the significance of the relationship in the correlation-regression model?
100. In which cases are non-parametric methods of communication used?
101. What is the correlation coefficient of ranks? Methods of its calculation.
102. What is the Fechner coefficient?
103. In which cases use the coefficients of association and contingency?
104. What is called a series of speakers? What elements make up the time series?
105. Rules for constructing time series.
106. What types of time series do you know?
107. What methods do you know to calculate the indicators of time series?
108. How to calculate the absolute growth rate, growth rate, growth rate?
109. What characterizes the absolute value of 1% increase?
110. How to calculate the average level for the interval and moment series of time?
111. How to calculate the average absolute increase, the average growth rate?
112. Name the ways of equalization of time series, their essence.
113. How to align the time series by enlarging periods?
114. How to align the time series by moving average?
115. What is the essence of the method of analytical alignment of time series by the method of least squares?
116. What is interpolation and extrapolation of time series?
117. How to calculate the monthly seasonality indices, the average annual seasonality ratio?
118. What is a statistical index?
119. What are the types of indices?
120. What is an individual index? Give examples of individual indices.
121. What value is called indexed, commensurate?
122. Rules for constructing aggregate indices.

123. Give the formulas of the main types of general indices.
124. Show the relationship between indices of physical output, cost and total production costs.
125. What is the essence of the calculation of general indices through the averaging of individual indices?
126. The rule of constructing arithmetic mean indices.
127. The rule of construction of harmonic indices.
128. How to determine the indices of absolute indicators of change in the studied phenomena?
129. What is the index of variable composition?
130. What subindexes are decomposed indices of variable composition?
131. What characterizes the index of permanent composition?
132. What characterizes the index of structural changes?
133. Features of construction of territorial indices.
134. Construct a territorial price index of variable composition, fixed composition, structural changes.
135. What is a statistical graph?
136. Name the main elements of statistical graphs.
137. What does the graph scale reflect? Name the types of scales.
138. How do you know the types of graphs?
139. What are the types of diagrams?
140. How to build bar charts?
141. How to build bar charts and what they are used for?
142. What kind of diagrams are used to depict the structure of the phenomenon?
143. What is the method of sign figures?
144. What is a cartogram? What are the types of cartograms?
145. What is a chart diagram?

Test questions

Question 1. Name the type of grouping that is used for studying the availability and direction of connection between signs, from which one is effective, and another - factor that affects the result: (answer-word).
Question 2. Intervals in which minimum and maximum values of a sign are known we call: Choose one correct answer:
1. equal 2. closed 3. unequal 4. open
Question 3. Statistical pattern as an important statistical category includes the following conformities: Choose one or several correct answers:
1. development of phenomena 2. structural shifts 3. change of phenomena in the past 4. division of elements of the aggregate 5. connection between the phenomena
Question 4. On 20 (n) plots of agricultural lands the average yield is 30 centners / ha (\bar{y}). $n_1=10, n_2=5, n_3=5, \bar{y}_1=25, \bar{y}_2=31$). Calculate the average yield of third group.
Question 5. Signs that do not have quantitative expression and are recorded as a text record belong to the attribute signs

Answer	1. Correct
	2. Incorrect
Question 6. To statistical rows of distribution we refer: Choose one or several correct answers:	
1. ranged 2. variational 3. structural 4. attributive	
Question 7. Choose the correct sequence during the construction of interval row of distribution:	
1. determine the number of groups of studied aggregate 2. calculate the value of the interval 3. allocate variants in ranged row 4. determine the interval boundaries	
Question 8. What is the sum of deviations of individual values of the sign from the arithmetic middling?	
Question 9. According to the plan for the current year revenue from product sales was 255 thousands of UAH., actually - 258 thousands. Determine the relative index of executing planned task.	
Question 10. Which of the following dispersion correlations do not match the rule of adding variances: Choose one correct answer:	
1. $\sigma^2_{\text{заг.}} = \sigma^2_{\text{гр.}} + \sigma^2_{\text{внг.}}$ 2. $\sigma^2_{\text{гр.}} = \sigma^2_{\text{заг.}} - \sigma^2_{\text{внг.}}$ 3. $\sigma^2_{\text{внг.}} = \sigma^2_{\text{заг.}} - \sigma^2_{\text{гр.}}$ 4. $\sigma^2_{\text{внг.}} = \sigma^2_{\text{гр.}} + \sigma^2_{\text{заг.}}$	
Question 11. Choose a formula for calculation limited sampling error Choose one or several correct answers:	
1. $\Delta_{\bar{x}} = t \cdot m_x$ 2. $\Delta_{\bar{x}} = t \cdot \sqrt{\frac{\sigma^2}{n}}$ 3. $\Delta_{\bar{x}} = \sqrt{\frac{\sigma^2}{n}}$	
Question 12. If all frequencies of the row of distribution increase or decrease in the constant number of times k, the arithmetic middling will increase or decrease in k times	
Answer	1. Correct
	2. Incorrect
Question 13. Net profit during the first year increased on 10%, during the second - on 5%, third - 15%. On what percentage did the profit increase over three years?	
Question 14. Choose the correct sequence of growth of different types of middling calculated for one and the same variation row (majorization):	
1. geometric 2. quadratic 3. harmonic 4. arithmetic	
Question 15. Determine compliance with calculation of individual indexes and their concrete species:	

A. $i_q = \frac{q_1}{q_0}$	1. price index 2. index of physical size of goods 3. index of the commodity circulation
B. $i_p = \frac{p_1}{p_0}$	
C. $i_{qp} = \frac{p_1 q_1}{p_0 q_0}$	
Question 16. System of measures that turn to increase crop yield in agriculture is called (answer – in a word)	
Question 17. Square of average error is directly proportional to the dispersion of the sign in the general aggregate and is inversely proportional to size of sampling	
1. Yes 2. No	
Question 18. Write linear form of regression:	
Question 19. What is region of acceptability? Choose one correct answer:	
1. number of acceptability position of sample point in sample space that lead to acceptance of null hypothesis 2. sample space of sample variable 3. critical region 4. statistical criterion	
Question 20. Match names of average values with the methods of their calculation:	
A. $\bar{x} = \frac{\sum_{j=1}^n x_j}{n}$	1. quadratic middling 2. arithmetic middling 3. harmonic middling 4. geometric middling
B. $\bar{x} = \sqrt{\frac{\sum_{j=1}^n x_j^2}{n}}$	
C. $\bar{x} = \frac{n}{\sum_{j=1}^n \frac{1}{x_j}}$	
D. $\bar{x} = \sqrt[n]{x_1 x_2 x_3 \dots x_n}$	
Question 21. Index of the commodity circulation increased on 10%, price index decrease on 10%. Find index of yielding:	
Question 22. Errors which appears from imperfect research tools or methods are called Choose one correct answer:	
1. system 2. random 3. intentional	
Question 23. What is region of acceptability? Choose one correct answer:	
1. number of acceptability position of sample point in sample space that lead to acceptance	

of null hypothesis 2. sample space of sample variable 3. critical region 4. statistical criterion	
Question 24. Which areas are not include to spring productive area: (Choose one or several correct answers)	
1. reseeding 2. line spacing sowing on cultivated crops 3. sowing of closed soil 4. permanent grasses 5. green sowing	
Question 25. What means statistical hypothesis? Choose one or several correct answers:	
1. scientific assumption, that demands control, confirmation 2. scientific assumption about size of statistical characteristic 3. scientific assumption that needs to be controlled	
Question 26. When use average indexes: Choose one or several correct answers	
1. when do not complete information about same indexes that are analyzed 2. when unknown data about price change per unit of product for the base period of time 3. when necessary doing an analysis of social-economic phenomenon for long period of time	
Question 27. Sample, which quite accurately reflects the general aggregate is called: Choose one correct answer:	
1. unified 2. representative 3. identical	
Question 28. Process of development, movement of social-economic phenomenon's in time is called dynamic	
Answer	1. Right
	2. Wrong
Question 29. Value of varying sign which is in the middle of ranged distribution row Choose one correct answer:	
1. dispersion 2. mode 3. median 4. arithmetic	
Question 30. Determine correspondence of interconnection between phenomenons:	
A. particular significance of factor respons only one concrete significance of result	1.correlation relationship 2.function relationship
B. particular significance of factor respons multiple significance of result	

THE EXAMPLE OF THE VARIANT ON THE EXAM

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENT SCIENCES OF UKRAINE			
"Bachelor" specialty "Economics"	Statistics and Economic Analysis department 2023-2024	VARIANT 1 the discipline "Statistics"	Approved Head of Department of Statistics and Economic Analysis _____ (signature) <u>prof. I.D.Lazaryshyna</u> "____" 2023

Theoretical question

1. Organization of statistical work in Ukraine

Practical part

Task 1. According to the table. 1 determine the average output of employees by the formula of arithmetic mean and mode. Draw the appropriate conclusions.

Table 1. Distribution of employees by output

Products produced by 1 employee, %	to 80	80-85	85-90	90-95	95-100	More than100
Quantity of employee	2	7	9	14	29	9

Test questions

Question 1. Name the type of grouping that is used for studying the availability and direction of connection between signs, from which one is effective, and another - factor that affects the result: (answer-word).
Question 2. Intervals in which minimum and maximum values of a sign are known we call: Choose one correct answer:
1. equal 2. closed 3. unequal 4. open
Question 3. Statistical pattern as an important statistical category includes the following conformities: Choose one or several correct answers:
1. development of phenomena 2. structural shifts 3. change of phenomena in the past 4. division of elements of the aggregate 5. connection between the phenomena
Question 5. Choose a formula for calculation limited sampling error Choose one or several correct answers:
1. $\Delta_{\bar{x}} = t \cdot m_x$ 2. $\Delta_{\bar{x}} = t \cdot \sqrt{\frac{\sigma^2}{n}}$

3. $\Delta_{\bar{x}} = \sqrt{\frac{\sigma^2}{n}}$	
Question 6. Choose the correct sequence of growth of different types of middling calculated for one and the same variation row (majorization):	
4. geometric 5. quadratic 6. harmonic 4. arithmetic	
Question 7. Determine compliance with calculation of individual indexes and their concrete species:	
A. $i_q = \frac{q_1}{q_0}$	1. price index 2. index of physical size of goods 3. index of the commodity circulation
B. $i_p = \frac{p_1}{p_0}$	
C. $i_{qp} = \frac{p_1 q_1}{p_0 q_0}$	
Question 8. Write linear form of regression:	
Question 9. Errors which appears from imperfect research tools or methods are called Choose one correct answer:	
4. system 5. random 6. intentional	
Question 10. Determine correspondence of interconnection between phenomenons:	
A. particular significance of factor respons only one concrete significance of result	1.correlation relationship 2.function relationship
B. particular significance of factor respons multiple significance of result	

Examiner _____ PhD, Associate Professor
(signature) O.G. Makarchuk

8. Teaching methods

Teaching methods are ways of joint activities and communication between teachers and graduates, providing positive motivation to learn, mastering the system of professional knowledge, skills and abilities, forming a scientific worldview, development of cognitive forces, culture of mental work of future professionals.

The following teaching methods are used during the educational process:

Depending on the source of knowledge: verbal (explanation, conversation, discussion, dialogue); visual (demonstration, illustration); practical (problem solving, business games).

By the nature of cognitive activity: explanatory-visual problem statement; partial search and research methods.

By place in educational activities:

- methods of organization and implementation of educational activities that combine verbal, visual and practical methods; reproductive and problem-searching; methods of educational work under the guidance of a teacher and methods of independent work of higher education students;

- methods of control and self-control over educational activities: methods of oral, written control; individual and frontal, thematic and systematic control.

In the process of teaching the discipline to intensify the educational and cognitive activities of higher education seekers provides for the use of the following educational technologies:

- work in small groups allows to structure practical seminars on the form and content, creates opportunities for participation of each student in higher education in the work on the topic of the lesson, provides the formation of personal qualities and experience of social communication;

- seminars-discussions involve the exchange of views and views of participants on this topic, as well as develop thinking, help to form views and beliefs, the ability to formulate opinions and express them, learn to evaluate other people's suggestions, critically approach their own views;

- brainstorming - a method of solving urgent problems, the essence of which is to express as many ideas in a limited period of time, discuss and select them;

- case method - a method of analysis of specific situations, which allows to bring the learning process closer to the real practical activities of specialists and involves consideration of industrial, managerial and other situations, complex conflicts, problematic situations, incidents in the study of educational material;

- presentations - speeches to the audience, used to present certain achievements, results of the group, a report on the implementation of individual tasks, briefings, demonstrations.

9. Forms of assessment

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 26.04.2023, protocol №10).

Ongoing control is carried out during practical, laboratory and seminar classes and aims to check the level of readiness of higher education students to perform specific work.

Intermediate control is conducted after studying the program material and should determine the level of knowledge of higher education students in the program material obtained during all types of classes and independent work.

Forms and methods of intermediate control, mastering the program material are developed by the lecturer of the discipline and approved by the relevant department in the form of testing, written tests, colloquium, etc., which can be assessed numerically.

Mastering the program material by a higher education student is considered successful if his / her rating is not less than 60 points on a 100-point scale.

Semester control is conducted in the form of a semester exam or semester test in a particular discipline.

The semester exam is a form of final attestation of mastering the theoretical and practical material on the academic discipline for the semester.

Semester test is a form of final control, which consists in assessing the mastering of higher education theoretical and practical material (performed by student certain types of work in practical, seminar or laboratory classes and during independent work) in the discipline for the semester.

Differentiated test is a form of control that allows to assess the implementation and mastery of higher education program of practical training, preparation and defense of course work (project).

Applicants for higher education are required to take exams and tests in accordance with the requirements of the working curriculum within the timeframe provided by the schedule of the educational process. The content of exams and tests is determined by the working curricula of disciplines.

The content of exams and tests is determined by the working curricula of disciplines.

10. 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 26.04.2023, protocol №10).

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 R_{dis} (up to 100 points), the rating from the exam R_{ex} (up to 30 points) is added to the rating of a student's academic work R_{aw} (up to 70 points): $R_{dis} = R_{aw} + R_{ex}$.

EVALUATION OF THE STUDENT'S KNOWLEDGE'S

Type of activity	Quantity of points	Taking into account the weight
Educational work	100	70
<u>Module 1. Steps of statistical observation and analysis techniques patterns of distribution (17%)</u>		
Practical work 1	12	0,12
Practical work 2	12	0,12
Practical work 3	10	0,10
Practical work 4	12	0,12
Practical work 5	12	0,12
Practical work 6	12	0,12
Test to the Module 1	30	0,30
Total sum to the Module 1	100	1
<u>Module 2. Methods of statistical analysis (18%)</u>		
Practical work 7	10	0,10
Practical work 8	10	0,10
Practical work 9	10	0,10
Individual work 1	10	0,10
Practical work 10	10	0,10
Practical work 11	10	0,10
Practical work 12	10	0,10
Test to the Module 2	30	0,30
Total sum to the Module 2	100	1
<u>Module 3. Statistics of Agriculture and Environment (17%)</u>		
Practical work 13	10	0,10
Practical work 14	5	0,05
Practical work 15	10	0,10
Practical work 16	10	0,10
Individual work 2	10	0,10
Practical work 17	5	0,05
Practical work 18	10	0,10
Practical work 19	10	0,10
Test to the Module 3	30	0,30
Total sum to the Module 3	100	1
<u>Module 4. Basic economic statistics (18%)</u>		
Practical work 20	14	0,14
Practical work 21	14	0,14
Practical work 22	14	0,14
Practical work 23	14	0,14
Individual work 24	14	0,14
Test to the Module 4	30	0,30
Total sum to the Module 4	100	1
Final attestation	100	0,3
Total sum from the discipline	100	1

11. Educational and methodological support

1. The course of Statistics in e-learn: <https://elearn.nubip.edu.ua/course/view.php?id=1722>
2. Макаrchук О.Г. Correlation analysis: educational-methodological recommendations on statistics for independent work of students under teacher supervision. Київ: ЦП «Компринт», 2015. 57 с.
3. Макаrchук О.Г., Воляк Л.Р. Методичні вказівки для англomовних лекційних занять «Agricultural statistics: methods and indices» з дисципліни «Статистика» для підготовки студентів ОС «Бакалавр» зі спеціальності 072 «Фінанси, банківська справа та страхування», 2021. 64 с.
2. Макаrchук О.Г., Воляк Л.Р. Методичні вказівки для англomовних лекційних занять «Agricultural statistics: economic approaches» з дисципліни «Статистика» для підготовки студентів ОС «Бакалавр» зі спеціальності 072 «Фінанси, банківська справа та страхування», 2021. 67 с.
4. Макаrchук О.Г., Воляк Л.Р. Методичні вказівки для навчальної практики «Methodological Instructions for Performance of Training Practice» з дисципліни «Статистика» для підготовки студентів ОС «Бакалавр» зі спеціальності 072 «Фінанси, банківська справа та страхування», 2021. 50 с.
5. Макаrchук О.Г., Воляк Л.Р. Методичні рекомендації. «STATISTICS (methods for studying the linkages of economic phenomena in agriculture). Educational-methodical publication on Statistics for preparation students of Bachelor dergee for the specialty of " Finance, banking and insurance", 2022. 66 p

12. Recommended sources of information

Main

Tutorials

1. Anderson D.R., Sweeney D.J., Williams T.A. Statistics for Business & Economics, 14th Edition, Cengage Learning, 2019, 1120 p.
2. Basic Statics. Electronic source: <https://www.adb.org/publications/basic-statistics-2017>
3. Illukkumbura A. Introduction to Regression Analysis (Easy Statistics), 2020, 121 p.
4. Quirk T. Excel 2010 for Business Statistics. A Guide to Solving Practical. Business Problems, School of Business and Technology Webster University, 2018, 264 p.
5. Quirk T. Excel 2019 in Applied Statistics for High School Students: A Guide to Solving Practical Problems (Excel for Statistics) 2nd ed., Springer, 2021, 264 p.
6. Горкавий В.К. Статистика: Навч. посібник. К.: Алерта, 2020. 644 с.
7. Горошанська О.О. Статистика: Практикум. Харк. держ. університет харчування та торгівлі. Харків, 2017. 133 с.
8. Козирєва О.В., Федорова В.О. Статистика: навчальний посібник. Х.: Видавництво Іванченка І.С., 2021. 187 с.
9. Мармоза А.Т. Практикум з теорії статистики і сільськогосподарської статистики: Навч. посіб. Центр навчальної літератури, 2019. 664 с.
10. Мармоза А.Т. Теорія статистики: Навч. посібник. К.: ЦУЛ, 2019. 592 с.
11. Опря А.Т., Дорогань-Писаренко Л.О., Єгорова О.В., Кононенко Ж.А. Статистика (модульний варіант з програмованою формою контролю знань). Навчальний посібник. Підручник. К.: Центр навчальної літератури, 2019. 536 с
12. Педченко Г. П. Статистика: Навчальний посібник Мелітополь: Колор Принт, 2018. 266 с.
13. Статистика : підручник. Колектив авторів: С. І. Пирожков, В. В. Рязанцева, Р. М. Моторин та ін. Київ : Київ. нац. торг.-екон. ун-т, 2020. 328 с.

14. Ткач Є.І., Сторожук В.П. Загальна теорія статистики: Навч.посібник. К.: Центр навчальної літератури, 2017. 442 с.
15. Чекотовський Е. Статистичні методи: Навч.посібник. К.: Знання, 2018. 408 с.

Legislation and regulations

16. Закон України "Про державну статистику" Закон введено в дію з дня прийняття (згідно з Постановою Верховної Ради України від 17 вересня 1992 року N 2615-XII) Із змінами і доповненнями, внесеними Законами України від 13 липня 2000 року N 1922-III (Законом України від 13 липня 2000 року N 1922-III цей Закон викладено в новій редакції), від 15 грудня 2005 року N 3205-IV, від 5 березня 2009 року N 1070-VI, від 1 червня 2010 року N 2289-VI (зміни, внесені Законом України від 1 червня 2010 року N 2289-VI, вводяться в дію з 31 липня 2010 року), від 2 грудня 2010 року N 2756-VI, від 13 січня 2011 року N 2938-VI
17. Наказ Державної служби статистики "Про затвердження форм державних статистичних спостережень у галузі сільського та рибного господарства" від 17.07.2012 р. №301
18. Наказ Державної служби статистики "Про затвердження Положення про Реєстр статистичних одиниць у сільському господарстві, мисливстві, лісовому і рибному господарстві – Реєстр АГРО" 02.07.2011 №278
19. Наказ Державного комітету статистики "Про затвердження Методики визначення постійних цін для розрахунку індексу обсягу сільськогосподарського виробництва" 20.12.2011 №363
20. Наказ Державного комітету статистики "Про затвердження Постійних цін 2010 року на сільськогосподарську продукцію для розрахунку індексу обсягу сільськогосподарського виробництва" 20.12.2011 №362
21. Наказ Державного комітету статистики України "Про затвердження Методологічних положень з організації державних статистичних спостережень зі статистики сільськогосподарських підприємств" 09.11.2011. №289
22. Наказ Державного комітету статистики України "Про затвердження Методики розрахунку індексів цін у сільському господарстві та індексів фізичного обсягу реалізованої сільськогосподарської продукції" 24.10.2011 №268
23. Наказ Державного комітету статистики України "Про затвердження Методологічних положень з організації державного статистичного спостереження щодо окремих показників розвитку сільських, селищних, міських рад у галузі сільського господарства" 30.09.2011 №247
24. Наказ Державної служби статистики України "Про затвердження форм державних статистичних спостережень зі структурної статистики" 01.08.2012 №321
25. Наказ Державного комітету статистики України "Про затвердження Методологічних положень з організації державного статистичного спостереження щодо структурних змін в економіці України та її регіонів" 22.12.2011 №366
26. Наказ Державного комітету статистики України "Про затвердження Методологічних основ та пояснень до позицій структури Статистичної класифікації продукції" 23.12.2011 №397
27. Наказ Державного комітету статистики України "Про затвердження Методологічних основ та пояснень до позицій Класифікації видів економічної діяльності" 23.12.2011 №396
28. Наказ Державного комітету статистики України "Про затвердження порядку підготовки та оприлюднення звіту про результати діяльності Держкомстату за рік та структури звіту про результати діяльності Держкомстату за 2008 рік" 11.02.2009 №47
29. Інструкція щодо заповнення форми державного статистичного спостереження №4–сг "Посівні площі сільськогосподарських культур під урожай 200__ року" (річна) зі змінами, затвердженими _____ наказом Державного комітету

статистики України 11.04.2011 № 87, зареєстрованим у Міністерстві юстиції України 29.04.2011 за № 535/19273.

30. Інструкція щодо заповнення форм державних статистичних спостережень № 24 “Стан тваринництва за 200 _ рік” (річна) та № 24-сг “Стан тваринництва на «_»_____200_ року” (місячна) Зі змінами, затвердженими наказом Державного комітету статистики України 11.04.2011 № 87, зареєстрованим у Міністерстві юстиції України 29.04.2011 за № 538/19276

31. Інструкція щодо заповнення форми державного статистичного спостереження № 50-сг "Основні економічні показники роботи сільськогосподарських підприємств" Зі змінами, затвердженими наказом Державного комітету статистики України 06.09.2010 №381, зареєстрованим у Міністерстві юстиції України 21.09.2010 №839/18134

32. Інструкція щодо заповнення форми державного статистичного спостереження №11-заг "Надходження худоби та птиці на переробні підприємства за січень – _____200_ року" (квартальна) Зі змінами, затвердженими наказом Державного комітету статистики України 17.05.2011 № 116, зареєстрованими у Міністерстві юстиції України 31.05.2011 №646/19384

Supplementary.

33. Кремень В.М., Кремень О.І. Фінансова статистика: Навч. посібник. К.: Центр навчальної літератури, 2017. 368 с.

34. Мармоза А.Т. Економічна статистика: Навч. посібник. К.: ЦУЛ, 2019. 600 с.

35. Підгорний А. З., Погорєлова Т. В. Фінансова статистика : навчальний посібник. Київ : ФОП Гуляєва В.М., 2020. 204 с.

36. Провост Ф., Фоусет Т. Data Science для бізнесу. Як збирати, аналізувати і використовувати дані. Видавництво: Наш формат, 2019 . 400 с.

37. Толбатов Ю.А. Статистика засобами Excel: Навч. посібник. К.: Університет «Україна», 2019. 326 с.

Information Resources

1. Верховна Рада України. URL: <http://zakon.rada.gov.ua/>

2. Кабінет Міністрів України. URL: <http://www.kmu.gov.ua/control/>

3. Державний Комітет статистики України. URL: <http://ukrstat.gov.ua/>

4. Продовольча та сільськогосподарська організація ООН (ФАО). URL: <http://www.fao.org/>

5. Світовий банк. URL: <http://www.worldbank.org/>

6. Євростат. URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>

7. Положення про екзамени та заліки у Національному університеті біоресурсів і природокористування України, затверджене Вченою радою НУБіП України від 26.04.2023 р. протокол № 10. URL: https://nubip.edu.ua/sites/default/files/u284/polozh_ekzameni_zaliki_z_dopovnennyam_2023_na_sayt.pdf

