

NATIONAL UNIVERSITY
OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Statistics and Economic Analysis

“APPROVED”
Dean of the Faculty
“30” 05 2023 p.
Inna LAZARYSHYNA

“ENDORSED”
at the meeting of the Department
of Statistics and Economic Analysis
Protocol № 12 from “28” 04 2023
Head of the Department
Inna LAZARYSHYNA

“REVIEWED”
Guarantor of the educational program
Entrepreneurships, Trade and Exchange Activity
Valentyna YAVORSKA

WORKING PROGRAM OF EDUCATIONAL DISCIPLINE

Statistics

Specialty 076 «Entrepreneurships and Trade Exchange»
Educational program Entrepreneurships, Trade and Exchange Activity
Economic Faculty
Developers: Lesia Voliak, Associate Professor of the Department of Statistics and
Economic Analysis, PhD in Economics
(посада, науковий ступінь, вчене звання)

Kyiv – 2023

Description of the discipline

STATISTICS

(на3Ба)

Sphere of knowledge, training direction, specialty, education and qualification level		
Education and qualification level	Bachelor	
Specialty	076 «Entrepreneurships and Trade»	
Training direction	Entrepreneurships, Trade and Exchange Activity	
Characterization of discipline		
Type	Mandatory discipline	
Total number of hours	180	
Number of ECTS credits	6	
The number of structural modules	4	
Course project (work) (if your curriculum)	+	
Form of control	Pass / Exam	
Indicators of discipline for full-time and distance learning		
	full-time education	distance education
Year of training	1,2	
Semester	2,3	
Lectures	75 hours	
Practical, seminars	75 hours	
Laboratory studies	-.	
Independent work	30 hours	
Individual tasks	-	
The number of weekly hours for full-time study: classroom	6,4 hours	

1. Purpose, tasks and competencies of the discipline

The purpose of studying the discipline "Statistics" is a deep and thorough mastering by students of statistical methods of collecting, processing and analyzing information on socio-economic phenomena and processes that should be used in modern conditions in conducting statistical research. Acquisition of skills of practical solution of statistical problems with the use of modern computer technology and problem-oriented application packages.

The main tasks of studying the discipline "Statistics" are the study of methodological and methodological issues of statistical research of socio-economic processes, the principles of statistical observations, methods of calculating indicators, methods of statistical analysis and presentation of information.

As a result of studying the discipline the student must

know:

- theoretical foundations of statistical observation as a way of forming an information base for research and management decisions;
- methodical approaches to generalization and processing of statistical data;
- methodology and methods of extensive and intensive statistical analysis of socio-economic phenomena and processes;
- methods of forecasting and statistical modeling of socio-economic parameters.

be able:

- apply methods of statistical observation to form an array of primary data for statistical research;
- to process primary data in order to obtain generalized indicators, distribution series, relative, average values, indicators of variation, etc .;
- perform the necessary analytical calculations using computer technology in accordance with the purpose of statistical research, the available source statistical information;
- to carry out the statistical analysis of financial and economic activity, level of social and economic development of the region, economic interpretation of the received results,
- make sound conclusions and forecast calculations.

Acquisition of competencies:

general competencies (GC):

GC 1. Ability to abstract thinking, analysis and synthesis.

GC 2. Ability to apply the acquired knowledge in practical situations.

GC 5. Skills in the use of information and communication technologies.

GC 6. Ability to search, process and analyze information from various sources.

professional (special) competencies (PC):

PC 2. Ability to choose and use appropriate methods, tools to justify decisions on the establishment, operation of business, trade and exchange structures.

PC 10. Ability to do business planning, assess market conditions and performance in the field of entrepreneurship, trade and exchange practices, taking into account risks.

2. Curriculum and structure of the discipline for full-time bachelors.

Names of Modules and Themes	Quantity of Hours												
	Full-time							Заочна форма					
	weeks	Total	including					Total	including				
			L	Pr.	Lab	Ind.	I.W.		L	Pr.	Lab	Ind.	I.W.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SEMESTER 2													
Module 1. Stages of statistical observation and methods of analysis of distribution patterns													
Topic 1. Methodological principles of statistics	1	5	2	2			1						
Topic 2. Statistical observation	1-2	5	2	2			1						
Topic 3. Compilation and grouping of statistics. Statistical tables	2-3	9	4	4			1						
Topic 4. Generalizing statistical indicators	3-4	9	4	4			1						
Topic 5. Analysis of distribution series	5-6	9	4	4			1						
Topic 6. Analysis of concentration, differentiation and similarity of distributions	6	5	2	2			1						
Topic 7. Selective method	7	7	2	4			1						
Total for module 1		49	20	22			7						
Module 2 Methods of statistical data analysis													
Topic 8. Statistical methods for measuring relationships	8-9	14	6	6			2						
Topic 9. Analysis of the intensity of dynamics	10-11	14	6	6			2						
Topic 10. Analysis of development trends and fluctuations	12-13	11	6	4			1						
Topic 11. Index analysis	13-14	9	4	4			1						
Topic 12. Statistical graphs	15	8	3	3			2						
Total for module 2		56	25	23			8						
SEMESTER 3													
Module 3. Statistics of the socio-economic sphere													
Topic 13. General principles and objectives of socio-economic statistics	1	5	2	2			1						
Topic 14. Statistics of national wealth and means of production.	2-3	9	4	4			1						
Topic 15. Statistics of gross domestic product and gross national income	4	5	2	2			1						

Topic 16. Statistics of population, labor and labor	5	5	2	2			1						
Topic 17. Statistics of efficiency of social production	6	5	2	2			1						
Topic 18. Statistics of the monetary sector of the economy	7	5	2	2			1						
Topic 19. Securities market statistics	8	6	2	2			2						
Total for module 3		40	16	16			8						
Module 4. Statistics of exchange trade													
Topic 20 Statistics of market conditions	9	5	2	2			1						
Topic 21. Statistical methods of marketing research	10	5	2	2			1						
Topic 22. Price statistics	11-12	9	4	4			1						
Topic 23. Traffic statistics	13	5	2	2			1						
Topic 24 Commodity exchange statistics.	14	5	2	2			1						
Topic 25 Statistics of market infrastructure	15	6	2	2			2						
Total for module 4		35	14	14			7						
Total sum	120		30	30			60						

3. Topics of practical classes

#	Name topics	Number of hours
1.	Topic 1. Methodological principles of statistics	1
2.	Topic 2. Statistical observation	1
3.	Topic 3. Compilation and grouping of statistics. Statistical tables.	4
4.	Topic 4. Generalized statistical indicators	2
5.	Topic 5. Analysis of distribution series	4
6.	Topic 6. Analysis of concentration, differentiation and similarity of distributions	2
7.	Topic 7. Selective method	2
8.	Topic 8. Statistical methods for measuring relationships	6
9.	Topic 9. Analysis of the intensity of dynamics	4
10.	Topic 10. Analysis of development trends and fluctuations	2
11.	Topic 11. Index analysis	4
12.	Topic 12. Statistical graphs	4
13.	Topic 13. General principles and objectives of socio-economic statistics	2
14.	Topic 14. Statistics of national wealth and means of production.	8
15.	Topic 15. Statistics of gross domestic product and gross national wealth	2
16.	Topic 16. Statistics of population, labor and labor	2
17.	Topic 17. Statistics of efficiency of social production	2
18.	Topic 18. Statistics of the monetary sector of the economy	2
19.	Topic 19. Securities market statistics	2
20.	Topic 20 Statistics of market conditions	4
21.	Topic 21. Statistical methods of marketing research	2
22.	Topic 22. Price statistics	4
23.	Topic 23. Traffic statistics	3
24.	Topic 24 Commodity exchange statistics.	4
25.	Topic 25 Statistics of market infrastructure	2

4. Control questions, sets of tests to determine 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?

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENT SCIENCES OF UKRAINE			
"Bachelor"	Statistics and Economic Analysis department	Ticket number <u>1</u> the discipline "Statistics"	Approved Chief of Department of Statistics and Economic Analysis _____ (signature) prof. Inna LAZARYSNYNA _____2023p.
Examination task			
I. Theoretical question			
Explain the essence of the random component of the econometric model			
II. Problem			
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. Make appropriate conclusions.			
III. Test			

Question 1. Match names of average values with the methods of their calculation:	
A. $\bar{x} = \frac{\sum_{i=1}^n x}{n}$	1. quadratic middling 2. arithmetic middling 3. harmonic middling 4. geometric middling
B. $\bar{x} = \sqrt{\frac{\sum x^2}{n}}$	
C. $\bar{x} = \frac{n}{\sum_{j=1}^m \frac{1}{x}}$	
D. $\bar{x} = \sqrt[n]{x_1 x_2 x_3 \dots x_n}$	
Question 2. 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 3. 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 4. 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 5. 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 6. 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 7. Sample, which quite accurately reflects the general aggregate is called: Choose one correct answer:	
1. unified 2. representative 3. identical	
Question 8. Process of development, movement of social-economic phenomenon's in time is called dynamic	
Answer	1. Right
	2. Wrong
Question 9. 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 10. Determine correspondence of interconnection between phenomena:	
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	

5. Methods of education

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

6. Control forms

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.

Current control		Rating of Academic Affairs R HP	Rating of additional work R ДР	Fine rating R ИТП	Final certification (exam or test)	Total quantity of marks
Module 1	Module 2					
0-100	0-100	0-70	0-20	0-5	0-30	0-100

1. Distribution of points received by students. Assessment of student knowledge is on a 100-point scale and is translated into national assessments according to table. 1 "Regulations on examinations and tests in NULES of Ukraine" (order of entry into force of 26.04.2023 № 10)

Student rating, points	National assessment based on the results of the compilation	
	exams	tests
90-100	Excellent	Passed
74-89	Good	
60-73	Satisfactorily	
0-59	Unsatisfactorily	Not passed

To determine the rating of the student (listener) for mastering the discipline Рдис (up to 100 points), the obtained rating for certification (up to 30 points) is added to the

rating of the student (listener) for the educational work of the R_{HP} (up to 70 points):

$$R_{\text{ДИС}} = R_{\text{HP}} + R_{\text{АТ}}.$$

8. Methodical support

1. Regulations.
2. Complex teaching of the discipline.
3. Methodological guidelines for independent study courses.
4. Methodological guidelines for writing a term paper.
5. Elearn <https://elearn.nubip.edu.ua/course/view.php?id=1744>

12. Recommended literature

Legislation and regulations

1. Закон України «Про офіційну статистику» № 2524-IX від від 16.08.2022 р.
URL: <https://zakon.rada.gov.ua/laws/show/2524-20#Text>
2. Наказ Державної служби статистики Про затвердження форм державних статистичних спостережень у галузі сільського та рибного господарства" від 14.06.2013 № 18. URL: <https://zakon.rada.gov.ua/rada/show/v0181832-13#Text>
3. 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 (Редакція від 09.09.2019).
URL: <https://zakon.rada.gov.ua/rada/show/v0278832-12#Text>

Tutorials

2. Freund J., Perles B. Modern Elementary Statistics // Pearson New International Edition PDF eBook 12th Edition, 2013.
3. Quirk T. Excel 2010 for Business Statistics. A Guide to Solving Practical Business Problems, School of Business and Technology Webster University. 2018. 264 p.
4. Shao J. Mathematical Statistics: Exercises and Solution, Springer, 2016, 385 p. Basic Statics. URL: <https://www.adb.org/publications/basic-statistics-2017>
5. Економічна статистика: Навч. посібник. /За заг. ред. Р. М. Моторіна. К.: КНЕУ 2015
6. Єріна А. М. Економічна статистика : підручник : у 2 ч. Ч. 1. Макроекономічна статистика / [І. Г. Манцуров, А. М. Єріна, О. К. Мазуренко та ін.] ; за наук. ред. чл.-кор. НАНУ І. Г. Манцура. К. : КНЕУ, 2014. 325 с.
7. Єріна А.М., Мазуренко О.К, Пальян З.О. Економічна статистика: Практикум. - К.: ТОВ „УВПУ „Екс Об", 2019. 232с.
8. Логунова Н.А., Статистика II: підручник / Н. А. Логунова. К.: Кондор-Видавництво, 2015, 340 с.

9. Мармоза А.Т. Практикум з теорії статистики і сільськогосподарської статистики: Навч. посібник. К.: Центр навчальної літератури, 2019. 664 с.
10. Овчарук Р.Ю. Теорія статистики: Навч.посібник. К.: Вікар, 2014. 204 с.
11. Опря А. Т. Статистика (модульний варіант з програмованою формою контролю знань). Навч. посіб. К.: Центр учбової літератури, 2012. 448 с.
12. Семенова К. Д., Тарасова К. І. Бізнес-статистика : Підручник / К. Д. Семенова, К. І. Тарасова. К : ФОП Гуляєва В.М. 2018. 210 с.
13. Статистика: навчальний посібник / О.В. Козирєва, В.О. Федорова.– Х.: Видавництво Іванченка І.С., 2021. – 187 с.
14. Статистика: основи теорії та практикум: Навчальний посібник / Григорків В.С., Вінничук О.Ю., Григорків М.В., Маханець Л.Л. Чернівці : Чернівець. нац. ун-т, 2022. 304 с.
15. Ткач Є. І., Загальна теорія статистики: підручник [для студ. вищ. навч. закл.] / Ткач Є. І., Сторожук В. П. [3-тє вид.] К.: Центр учбової літератури, 2014. 442 с.
16. Чекотовський Е.В. Статистичні методи на основі Microsoft Excel 2016: навч. посіб. / Е.В. Чекотовський. К.: Знання, 2018. 408 с.

Supplementary

1. Єріна А. М. Економічна статистика: підручник: у 2 ч. Ч. 1. Макроекономічна статистика/ [І. Г. Манцуров, А. М. Єріна, О. К. Мазуренко та ін.]; за наук. ред. чл.-кор. НАНУ І.Г. Манцурова. К.: КНЕУ, 2013. 325
2. Економічна статистика: навчальний посібник/ В. М. Соболев, Т. Г. Чала, О. С. Корепанов та ін.; за ред. В. М. Соболева. Х.: ХНУ імені В. Н. Каразіна, 2017. 388 с.
3. Економічна статистика: підручник : у 2 ч. Ч. 1. Макроекономічна статистика / І. Г. Манцуров, А.М. Єріна, О.К. Мазуренко та ін.; за наук. Ред. чл.-кор.НАНУ І. Г. Манцурова. К.: КНЕУ, 2013. 325 с.
4. Статистика. Конспект лекцій: навчальний посібник/ Укл. Рарок О. В. Кам'янець-Подільський: ФОП Сисин І. Я., 2017. 202 с.

5. Тринько Р. І., Тадник М. Є. Основи теоретичної і прикладної статистики: [Навчальний посібник]/ Р. І. Гринько, М. Є. Тадник. К.: Знання, 2011. 400 с.

Інформаційні ресурси

1. Офіційний сайт Кабінету Міністрів України URL: <http://www.kmu.gov.ua/control/>

2. Офіційний сайт Державного Комітету статистики України. URL: <http://ukrstat.gov.ua/>

3. Офіційний сайт Продовольчої та сільськогосподарської організації ООН (ФАО). URL: <http://www.fao.org/>

4. Офіційний сайт Світового банку. URL: <http://www.worldbank.org/>

5. Офіційний сайт Євростату. URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>

6. Офіційний сайт Міністерства економічного розвитку і торгівлі України. URL: <http://www.kmu.gov.ua>

7. Офіційний сайт науково-інформаційного журналу «Статистика України». URL: <http://ntkstat.gov.ua>