

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

Department of Statistics and Economic Analysis

“CONFIRMED”

Dean of the Economic faculty,



Anatolii DIBROVA

"28" August 2024

“APPROVED”

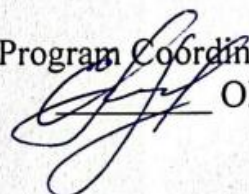
at the meeting of the Department
of Statistics and Economic Analysis
Minutes № 1 from “20” August 2024



Andriy MUZYCHENKO

“REVIEWED”

Program Coordinator



Olena KIREITSEVA

**PROGRAM OF THE COURSE
STATISTICS**

Field of Study 05 Social and behavioral sciences
Specialty 051 "Economics"
Academic program "International Economics"
Faculty: Economic faculty
Lecturer: Makarchuk O.G., Associate Professor of the Department of
Statistics and Economic Analysis, PhD in Economics, Associate
Professor

**Description of the course
STATISTICS**

| Field of Study, Specialty, Academic program, Academic degree | | |
|--|-------------------------------------|-----------|
| Academic degree | Bachelor | |
| Field of Study | 05 “Social and behavioral sciences” | |
| Specialty | 051 “Economics” | |
| Academic Program | International economics | |
| Characteristics of the course | | |
| Type | Compulsory | |
| Total number of hours | 180 | |
| Number of ECTS credits | 6 | |
| Number of content modules | 4 | |
| Term paper/Project paper | Applicable | |
| Form of assessment | Credit, Exam | |
| Educational practice | Applicable | |
| Indicators of the course for full-time and part-time forms of study | | |
| | Full-time | Part-time |
| Year of study | 1-2 | - |
| Semester | 2,3 | - |
| Lecture classes | 60 hours | - |
| Seminars | 75 hours | - |
| Laboratory | - | - |
| Self-study | 45 hours | - |
| Individual assignments | - | - |
| Hours per week (full-time program) | 5 hours | - |

1. Purpose, tasks competencies and program outcomes of the course

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 of the course are 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 competency (IC): the ability to solve complex specialized tasks and practical problems in the economic sphere, which are characterized by the complexity and uncertainty of conditions, which involves the application of theories and methods of economic science.

General competencies (GC):

GC 3. Ability to abstract thinking, analysis and synthesis.

GC 7. Information and communication skills technologies.

GC 8. Ability to search, process and analyze information from various sources.

Special (professional) competencies (SC):

SC 6. Ability to apply economic and mathematical methods and models for solving economic problems.

SC 7. Ability to use computer technologies and data processing software to solve economic tasks, information analysis and preparation analytical reports.

SC 8. The ability to analyze and solve problems in the field of economic and social and labor relations.

SC 9. Ability to predict based on standard theoretical and econometric models of socio-economic processes.

Program learning outcomes (PLO):

PLO 5. Apply analytical and methodical toolkit for substantiating proposals and acceptance management decisions by various economic agents (individuals,

households, enterprises and by state authorities).

PLO 8. Apply relevant economic and mathematical methods and models for solving economic problems.

PLO 19. Use information and communication technologies to solve socio-economic problems, prepare and present analytical reports.

2. Program and structure of the course for full-time and part-time forms of studying

| Modules and topics | Number of hours | | | | | | | | | | | | | |
|--|-----------------|-------|-----------|----|-----|------|-------|-----------|-----------|----|-----|------|-------|--|
| | full-time | | | | | | | part-time | | | | | | |
| | weeks | total | including | | | | | Total | including | | | | | |
| | | | 1 | p | lab | ind. | s.st. | | 1 | p | lab | ind. | s.st. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| Module 1. Steps statistical observation and analysis techniques patterns of distribution | | | | | | | | | | | | | | |
| Topic 1. Methodological Principles of Statistics | 1 | 4 | 2 | 2 | | | - | | | | | | | |
| Topic 2. Statistical observation | 2 | 5 | 2 | 2 | | | 1 | | | | | | | |
| Topic 3. Compilation and grouping (bunching) of statistical data. Statistical tables | 3 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 4. Analysis of the forms of statistical series distribution and their graphical representation | 4 | 6 | 2 | 2 | | | 2 | | | | | | | |
| Topic 5. Generalizing statistical indicators | 5 | 6 | 2 | 2 | | | 2 | | | | | | | |
| Topic 6. Analysis of variation | 6 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 7. Forms of statistical distribution | 7 | 6 | 2 | 2 | | | 2 | | | | | | | |
| Total for content module 1 | | 43 | 14 | 18 | | | 11 | | | | | | | |
| Module 2. Methods of statistical analysis | | | | | | | | | | | | | | |
| Topic 8. Sampling method | 8 | 6 | 2 | 2 | | | 2 | | | | | | | |
| Topic 9. Statistical methods for measuring correlation | 9-10 | 14 | 6 | 6 | | | 2 | | | | | | | |
| Topic 10. Time series and their analysis | 11-12 | 10 | 4 | 4 | | | 2 | | | | | | | |
| Topic 11. Analysis of trends and fluctuations | 13-14 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 12. Statistical tables and graphs | 15 | 6 | 2 | 2 | | | 2 | | | | | | | |
| Total for content module 2 | | 44 | 16 | 18 | | | 10 | | | | | | | |
| Module 3. Statistics of Agriculture and Environment | | | | | | | | | | | | | | |
| Topic 13. Subject and method of agricultural statistics | 1 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 14. Index Analysis | 2-3 | 12 | 4 | 4 | | | 4 | | | | | | | |
| Topic 15. Crop statistics | 4 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 16. Livestock statistics | 5 | 8 | 2 | 4 | | | 2 | | | | | | | |
| Topic 17. Statistics of production resources and efficiency of agricultural production | 6-7 | 10 | 4 | 4 | | | 2 | | | | | | | |
| Total for content module 3 | | 46 | 14 | 20 | | | 12 | | | | | | | |

| Module 4. <i>Basic economic statistics</i> | | | | | | | | | | | | | |
|--|-------|-----|----|----|--|--|----|--|--|--|--|--|--|
| Topic 18. Statistics of agricultural products | 8-9 | 12 | 4 | 4 | | | 4 | | | | | | |
| Topic 19. Statistics of market goods and services | 10-11 | 10 | 4 | 4 | | | 2 | | | | | | |
| Topic 20. Finance statistics | 12-13 | 10 | 4 | 4 | | | 2 | | | | | | |
| Topic 21. Price and inflation statistics | 14 | 8 | 2 | 4 | | | 2 | | | | | | |
| Topic 22. Statistics of investments and securities | 15 | 7 | 2 | 3 | | | 2 | | | | | | |
| Total for content module 4 | | 47 | 16 | 19 | | | 12 | | | | | | |
| Total hours | | 180 | 60 | 75 | | | 45 | | | | | | |
| Course project on Statistics | | | | | | | | | | | | | |
| Total hours | | 180 | | | | | | | | | | | |

3. Topics of seminar (practical, laboratory) classes

| № | Topic title | 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. | 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. | 2 |
| 6 | Distribution regularity. Variation characteristic. Characteristic of distribution forms. | 4 |
| 7 | Characteristic of distribution center. Kinds and interconnection of dispersion. | 2 |
| 8 | Sence of sampling method. Sampling values of average and share. Sampling kinds. Statistical verification of hypothesis. | 2 |
| 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. | 2 |
| 13 | Subject and method of agricultural statistics | 4 |
| 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. 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. | 4 |
| 16 | Object, tasks and system of statistics for animal husbandry. Statistics of quantity and structure of agrarian animals. Indexes of movement | 4 |

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

4. Self-study work topics

| № | Topic title | Hours |
|--------------------|--|-----------|
| 1. | Statistical observation | 1 |
| 2. | Compilation and grouping (bunching) of statistical data. Statistical tables | 2 |
| 3. | Analysis of the forms of statistical series distribution and | 2 |
| 4. | Generalizing statistical indicators | 2 |
| 5. | Analysis of variation | 2 |
| 6. | Forms of statistical distribution | 2 |
| 7. | Sampling method | 2 |
| 8. | Statistical methods for measuring correlation | 2 |
| 9. | Time series and their analysis | 2 |
| 10. | Analysis of trends and fluctuations | 2 |
| 11 | Statistical tables and graphs | 2 |
| 12 | Subject and method of agricultural statistics | 2 |
| 13 | Index Analysis | 4 |
| 14 | Crop statistics | 2 |
| 15 | Livestock statistics | 2 |
| 16 | Statistics of production resources and efficiency of agricultural production | 2 |
| 17 | Statistics of agricultural products | 4 |
| 18 | Statistics of market goods and services | 2 |
| 19 | Finance statistics | 2 |
| 20 | Price and inflation statistics | 2 |
| 21 | Statistics of investments and securities | 2 |
| Total hours | | 45 |

5. Diagnostic tools for learning outcomes

- Exam;
- Module tests;
- Calculation of practical works;
- Defence of practical works.

6. Methods of teaching

Methods of teaching are methods of joint activity and communication between the teacher and students of higher education, which ensure the development of positive motivation for learning, mastery of the system of professional knowledge, skills and abilities, the formation of a scientific worldview, the development of cognitive powers, the culture of mental work of future specialists.

The following teaching methods are used during the educational process:

- verbal method (lecture, discussion, interview);
- practical method (practical classes);
- visual method (illustration method, demonstration method);
- work with educational and methodical literature (summarizing, summarizing, annotating, reviewing, writing an abstract);
- video method (remote, multimedia, web-oriented, etc.);
- independent work (task performance);
- individual research work of students of higher education.

7. Assessment methods

- exam;
- oral or written survey;
- module testing;
- presentations and speeches at scientific and practical events.

8. Distribution of grades received by students

Assessment of student knowledge is on a 100-point scale and is translated into national assessments according to “Regulations on examinations and tests in NULES of Ukraine”.

| 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): $R_{dis} = R_{aw} + R_{ex}$.

9. Educational and methodological support

1. Makarchuk O.G. Electronic training course of the discipline «Statistics». URL: <https://elearn.nubip.edu.ua/course/view.php?id=1722>

2. Abstracts of lectures and their presentations (in electronic form). URL: <https://elearn.nubip.edu.ua/course/view.php?id=1722>

3. Макарчук 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 051 «Економіка», 2021. 64 с.

4. Макарчук 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 051 «Економіка», 2021. 67 с.

5. Макарчук 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 051 «Економіка», 2021. 50 с.

6. Макарчук О.Г., Воляк Л.Р. Методичні рекомендації. Statistics (methods for studying the linkages of economic phenomenons in agriculture). Educational-methodical publication on Statistics for preparation students of Bachelor degree for the specialty "Economics", 2022. 66 p.

7. Макарчук О.Г. Статистика. Методичні вказівки для лекційних та практичних занять для підготовки студентів ОС "Бакалавр" зі спеціальності 051 «Економіка» освітньої програми «Міжнародна економіка» (Частина 1), К.: НУБіП України. 2024. 74 с.

8. Макарчук О.Г. Статистика. Методичні вказівки для лекційних та практичних занять для підготовки студентів ОС "Бакалавр" зі спеціальності 051 «Економіка» освітньої програми «Міжнародна економіка» (Частина 2), К.: НУБіП України. 2024. 91 с.

9. Макарчук О.Г. Statistics. Methodical guidelines for studying the discipline "Statistics" for students of the first (bachelor's) level of higher education, specialty 051 "Economics", academic programme "International Economics", К.: НУБіП України. 2024. 64 с.

10. Recommended sources of information

1. Anderson D.R., Sweeney D.J., Williams T.A. Statistics for Business & Economics, 14th Edition, Cengage Learning, 2019, 1120 p.
2. Hamulczuk M., Makarchuk O., Kuts T. Time-Varying Integration of Ukrainian Sunflower Oil Market with the EU Market. *Agris on-line (Papers in Economics and Informatics)*. 2021. Vol. XIII, №3. P. 35-49.
URL: <https://doi.org/10.7160/aol.2021.130304>
3. Hamulczuk M., Cherevyk D., Makarchuk O., Kuts T., Voliak L. Integration of Ukrainian grain markets with foreign markets during russia's invasion of Ukraine. *Zagadnienia Ekonomiki Rolnej Problems of Agricultural Economics*. 2023. Vol. 377(4). P. 1-25. URL: <https://doi.org/10.30858/zer/177396>
4. Illukkumbura A. Introduction to Regression Analysis (Easy Statistics), 2020, 121 p.
5. Kuts T., Makarchuk O. Environmental Awareness of students of National University of Life And Environmental Sciences (Nules) of Ukraine in the context of modern challenges, *Papers: Management, Economic Engineering in Agriculture & Rural Development*. 2023. Vol. 23 Issue 16, P. 363-370.
URL: https://managementjournal.usamv.ro/pdf/vol.23_2/Art42.pdf
6. Makarchuk O., Kuts T., Voliak L. Green economy in Ukraine: analysis and modelling of development in agriculture. *Grail of Science*, 2024. №46, pp. 264-270. URL: <https://archive.journal-grail.science/index.php/2710-3056/issue/view/29.11.2024/34>
7. Makarchuk O., Kuts T., Labenko O., Kuts O. Market evaluation of rapessed in Ukraine: perspectives and challenges. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural development*. 2024. Vol. 24 (4), pp. 505-513.
URL: https://managementjournal.usamv.ro/pdf/vol.24_4/volume_24_4_2024.pdf
8. Makarchuk O. Sunflower oil market in Ukraine: state and challenges. *Біоекономіка і аграрний бізнес*. 2022 р., НУБіП України. 2022. №2. С. 100-110. URL: <https://economicscience.com.ua/uk/journals/t-13-2-2022/rinok-sonyashnikovoyi-oliyi-v-ukrayini-stan-ta-vikliki>
9. 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.
10. Вінничук О. Ю., Григорків М. В., Маханець Л. Л. Статистика: тестові завдання: навч. посібник. Чернівці : Чернівецький нац. ун-т, 2023. 180 с.
11. Горкавий В.К. Статистика: підручник. Третє вид., переробл. і доповн. Київ: Алерта, 2020. 644 с.
12. Городянська Л.В., Сизов А.І. Статистика для економістів: навчальний посібник. Київ: Нац. ун-т ім. Т.Шевченка, 2019. 350 с.
13. Григорків В.С., Вінничук О.Ю., Григорків М.В., Маханець Л.Л. Статистика: основи теорії та практикум: навчальний посібник. Чернівці: Чернівец. нац. ун-т, 2022. 304 с.

14. Козирєва О.В., Федорова В.О. Статистика: навчальний посібник. Х.: Видавництво Іванченка І.С., 2021. 187 с.
15. Кушнір Н.Б. Статистика: навчальний посібник. Київ: Центр учбової літератури, 2019. 208 с.
16. Мармоза А.Т. Практикум з теорії статистики і сільськогосподарської статистики: Навч.посіб. Центр навчальної літератури, 2019. 664 с.
17. Мармоза А.Т. Теорія статистики: Навч. посібник. К.: ЦУЛ, 2019.592 с.
18. Методологічні положення зі статистики.
URL: https://ukrstat.gov.ua/metod_polog/old/titul_old.html
19. 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
20. Офіційний сайт Державної служби статистики України.
URL: <http://ukrstat.gov.ua/>
21. Офіційний сайт Державної служби України з питань праці.
URL: <https://dsp.gov.ua/>
22. Офіційний сайт Євростату.
URL: <http://err.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
23. Офіційний сайт Кабінету Міністрів України.
URL: <http://www.kmu.gov.ua/control/>
24. Офіційний сайт Міністерства економічного розвитку і торгівлі України. URL: <http://www.kmu.gov.ua>
25. Офіційний сайт Продовольчої та сільськогосподарської організації ООН (ФАО). URL: <http://www.fao.org/>
26. Офіційний сайт Світового банку. URL: <http://www.worldbank.org/>
27. Педченко Г. П. Статистика: навчальний посібник. Мелітополь: Колор Принт, 2018. 266 с.
28. Підгорний А. З., Погорелова Т. В. Фінансова статистика : навчальний посібник. Київ : ФОП Гуляєва В.М., 2020. 204 с.
29. Провост Ф., Фоусет Т. Data Science для бізнесу. Як збирати, аналізувати і використовувати дані. Видавництво: Наш формат, 2019 . 400 с.
30. Скрипник А. В., Галаєва Л. В., Коваль Т. В., Шульга Н. Г. Практикум «Теорія ймовірностей». Навч. пос. Київ: ВЦ «Компринт», 2019. 464 с.
31. 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.
32. Статистико-аналітичне забезпечення управління інноваційним розвитком економічних суб'єктів. За заг. ред. В.К. Савчука. К.: ФОП Ямчинський О. 2020. 385 с.
33. Ткач Є. І., Сторожук В. Загальна теорія статистики: підручник. Київ: Центр навчальної літератури, 2019. 442 с.

34. Толбатов Ю.А. Статистика засобами Excel: Навч. посібник. К.: Університет «Україна», 2019. 326 с.
35. Тютченко С.М. Практикум з навчальної дисципліни «Статистика»: навч.-метод.посіб. Дніпро: ДДУВС, 2022. 52 с.
36. Чекотовський Е. В. Статистика з Microsoft Excel 2016: навч. посіб. Київ: Знання України, 2019. 811 с.