SYLLABUS OF THE DISCIPLINE «PROBABILITY THEORY AND STATISTICS»

Level of Higher Education - Bachelor
Specialty**:** 073 “Management”
Educational program “Management”
Year of Study **1,** Semester **2**
The form of study**:** Full-time study
The number of ECTS credits**: 5**
Language of instruction: English

Course Lecturer

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Course page on eLearn https://elearn.nubip.edu.ua/course/view.php?id=1827

DESCRIPTION OF THE COURSE

The educational activity of each institution of higher education is aimed at training such specialists who could quickly adapt in real conditions and apply in practice the theoretical knowledge obtained during training. In the system of economic education, the place of "Theory of Probability and Statistics" as a discipline is determined by its role in the scientific and practical activities of society. "Probability theory and statistics" refers to a cycle of disciplines that form the profile of a future specialist, equipping him with the basics of theory and practice in the application of mathematical methods for studying the patterns of random phenomena, statistical evaluation and analysis of economic, social and other phenomena and processes.

The purpose of the course is the formation of modern thinking and a system of fundamental theoretical knowledge in the theory of probability and statistics in future specialists, as well as applied

practical skills with the use of information technology tools (MS Excel, SPSS, etc.), acquiring the skills of statistical research and analysis of economic phenomena and processes for the adoption effective management decisions.

The task of studying the discipline is the theoretical and practical training of students on the methodology and methods of research and analysis of mass statistical data using the tools of probability theory and statistics.

Acquisition of competencies:

Integrated competency (IC): The ability to solve complex specialized tasks and practical problems characterized by complexity and uncertainty in the conditions in the field of management or in the learning process, which involves the application of theories and methods of social and behavioral sciences

General Competencies (GC):

GC 4. Ability to apply knowledge in practical situations.

GC 8. Skills in using information and communication technologies.

GC 10. Ability to adapt and act in a new situation.

GC 12. The ability to generate new ideas (creativity).

Professional (special) competencies (PC):

PC 1. The ability to define and describe the characteristics of the organization.

PC 2. The ability to analyze the results of the organization's activities, to compare them with the factors of influence of the external and internal environment.

PC 10. The ability to evaluate the performed work, ensure their quality and motivate the personnel of the organization.

PC 12. Ability to analyze and structure organizational problems, form reasonable solutions.

Program Learning Outcomes (PLO):

PLO 4. Demonstrate skills in identifying problems and justifying management decisions.

PLO 6. Demonstrate the skills of searching, collecting and analyzing information, calculating indicators to substantiate management decisions.

COURSE STRUCTURE

Themes	Hours (lectures / laboratory classes)	Learning outcomes	Tasks	Knowledge assessment
Semester 2				
Content Module 1 ***Probability Theory and Mathematical Statistics***				
Theme 1. Concepts of Probability Research.	3/3	Understand the place of the discipline in professional training. Know the basic concepts and categories of probability theory. Understand the patterns of random phenomena, their properties and be able to perform operations on them and analyze the results. Justify the choice of methods and approaches for solving theoretical and applied problems and effectively use the modern mathematical apparatus in	Performing practical tasks on each topic in elearn. Performing Self-Study in elearn.	5
Theme 2. Conditional Probability; the Law of Total Probability and Bayes' Theorem.	1/1			5
Theme 3. Rules of Probability Distributions.	2/2			10
Theme 4. Discrete Random Variables (DRV) and Continuous Random Variables (CRV)	3/3			20
Theme 5. Probability Distributions. Law of	3/3			10

large numbers and central limit theorem.		professional activities.		
Theme 6. Systems of independent random variables.	Self-Study			-
Theme 7. Elements of Mathematical Statistics	3/3		Performing Self-Study in elearn.	20
Total, hours	**15/15**			**70**
Test to the Module 1				**30**
Total on the content of the module 1				**100**
Content Module 2 ***Stages of statistical observation and methods of analysis of patterns of distribution***				
Theme 8. Methodological principles of statistics	2/2	To understand the essence of the category of statistics, the peculiarities of statistical methodology. Know the basic concepts of statistical science. To have the skills of statistical observation, compilation and grouping of statistical data. Be able to perform calculations of generalizing statistical indicators, characteristics of variation, center and shape of distribution, unevenness of distribution. Understand the essence of the sampling method, ways of forming sample populations. Distinguish types of sampling error. Know and be able to determine point and interval estimates of the parameters of the general population; required sample size.	Performing practical tasks for each topic in elearn. Performing Self-Study work in elearn.	10
Theme 9. Statistical observation	2/2			
Theme 10. Compilation and grouping of statistical data. Statistical tables	2/2			10
Theme 11. Summarizing statistical indicators	2/2			10 Self s.w. 10
Theme 12. Analysis of distribution series	2/2			10
Theme 13. Analysis of concentration, differentiation and distribution similarity	2/2			10
Theme 14. Selective method in management	2/2			10
Total, hours	**14/14**			**70**
Test to the Module 2				**30**
Total on the content of the module 2				**100**
Content Module 3 ***Methods of statistical data analysis in management***				
Theme 15. Statistical methods of measuring relationships	6/6	Distinguish functional and stochastic dependence between features. Be able to	Performing practical tasks for each	25

Theme 16. Analysis of the intensity of dynamics	4/4	choose the form of the regression equation, build a regression model, interpret its parameters. Evaluate the closeness of the connection between the features. Check the significance of regression coefficients, correlation coefficient. Know the types of series of dynamics, features of their construction. To be able to determine analytical, average indicators of a number of dynamics, to identify trends in the development of phenomena using various methods. Analyze seasonal fluctuations. Understand the meaning of indexes in the management system. Use index tools for analytical calculations. Apply graphic methods of visualization of statistical data.	topic in elearn. Performing Self-Study work in elearn.	10
Theme 17. Analysis of development trends and seasonal fluctuations	2/2			10 Self s.w. 20
Theme 18. Index analysis in the management system	2/2			10
Theme 19. Graphic method in management	2/2			5
Total, hours	**16/16**			**70**
Test to the Module 3				**30**
Total on the content of the module 3				**100**
Total, hours	**45/45**	$R_{EW} = \frac{0,7 \cdot (R_{M1} + R_{M2} + R_{M3})}{3}$		**70**
Certification (**Exam)**				**30**
Total	$R_{COURSE} = R_{EW} + R_{Exam}$			**100**

EVALUATION POLICY

Deadline and reassembly policy:	Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Relocation of modules takes place with the permission of the teachers who provide the course, if there are serious reasons (for example, hospital).
Academic Integrity Policy:	Copying of the text during written tests and exams is prohibited. The use of mobile devices is allowed only with the permission of the teacher during online testing and preparation of practical tasks. Self-Study works in the form of abstracts, reports, presentations must have correct text links to the information sources used.
Attendance Policy:	Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually at a distance (online form in agreement with the dean of the faculty and the lecturer of the course).

STUDENT EVALUATION SCALE

National Grade	Rating of the Higher Education Learners, Score
“Excellent”	90 - 100
“Good”	74 - 89
“Satisfactory”	60 - 73
“Unsatisfactory”	0 - 59

REFERENCES

Main

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3. Cox Dennis, Cox Michael. The Mathematics of Banking and Finance. The Atrium, Southern Gate, Chichester , John Wiley & Sons Ltd, 2016. 332 p.
4. Devore Jay L., Berk Kenneth N. Modern mathematical statistics with applications. Belmont, Calif.: Thomson Brooks/Cole, 2007. 810p.
5. Drury C. Management and cost accounting. C&C Offset, China, 2016. 775p.
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8. Keller, Gerald. Essentials of business statistics / Gerald Keller, Brian Warrack. Wadsworth, Inc., 2014. 593p.
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13. 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.
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15. Simon Carl P., Blume Lawrence. Mathematics for economists. New York, London: W.W.Norton & Company, 2017. 930p.
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19. Горошанська О.О. Статистика: Практикум. Харк. держ. університет харчування та торгівлі. Харків, 2017. 133 с.
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Recommended sources of information (Electronic Resources)

1. Кабінет Міністрів України. URL: http://www.kmu.gov.ua/control/

2. Державний Комітет статистики України. URL: http://ukrstat.gov.ua/

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

4. Світовий банк. URL: http://www.worldbank.org/

5. Євростат. URL: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home

6. 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