МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ СЕМЕНА КУЗНЕЦЯ

ЗАТВЕРДЖЕНО
на засіданні кафедри
фінансів і кредиту
Протокол № 16 від 21.08.2025 р.

ПОГОДЖЕНО
Проректор з навчально-методичної роботи
_____ Каріна НЕМАШКАЛО

Візуалізація фінансово-економічних даних

робоча програма навчальної дисципліни (РПНД)

Галузь знань **всі**
Спеціальність **всі**
Освітній рівень **другий (магістерський)**
Освітня програма **всі**

Статус дисципліни **Вибіркова**
Мова викладання, навчання та оцінювання **Англійська**

Розробник:
к.е.н,
доцент _____ Світлана ЛЕЛЮК

Завідувач кафедри
фінансів і кредиту _____ Ірина ЖУРАВЛЬОВА

Харків
2025

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

APPROVED
at the meeting the Department
of Finance and Credit
Protocol № 16 dated August 21, 2025

AGREED
Vice-rector for educational and methodical work

_____ Karina NEMASHKALO

Financial and economic data visualization

Program of the course

Field of Knowledge	**All**
Specialty	**All**
Study cycle	**second (master's)**
Study programme	**All**

Course status	**Mandatory**
Language	**English**

Developer:
academic degree,
academic title _____ Svitlana LELIUK

Head of the Department
of Finance and Credit _____ Iryna ZHURAVLYOVA

:

Kharkiv
2025

INTRODUCTION

The academic discipline "Financial and economic data visualization" belongs to the cycle of professional training, belongs to the group of general educational components of master's training. The knowledge gained as a result of its study will help applicants to solve a wide range of tasks – from visual coding of tabular arrays of financial information to the implementation of a monitoring panel of financial indicators in the online space.

The purpose of the discipline "Financial and economic data visualization" is to develop in-depth knowledge and skills of existing information systems and digital technologies for visual processing of financial and economic information, their rational use, as well as practical skills in the effective use of modern digital technologies in the process of financial and economic activities of enterprises and organizations.

The objectives of the discipline are: to study the theoretical and practical aspects of the selection and application of specific tools and instruments for visualizing the results of financial and economic information analysis, forming theoretical and practical knowledge in building visualizations using tabular databases, forming knowledge in the search and implementation of financial data monitoring panels using modern tools and in the online space.

The subject of the discipline is software and tools that provide processing and visualization of financial and economic information.

The object of the discipline is the process of studying information systems and technologies used to process financial and economic statistical information from open databases, financial information at enterprises and institutions.

The learning outcomes and competencies that form the discipline are defined in Table 1.

Table 1

Learning outcomes and competencies formed by the discipline

Learning outcomes	Competencies
Use the fundamental principles of finance, banking and insurance development in combination with research and management tools to carry out professional and scientific activities	Ability to abstract thinking, analysis and synthesis; ability to use theoretical and methodological tools for diagnosing and modeling the financial activities of business entities
Choose modern tools for creating visualizations of financial and economic data	The ability to search, use and interpret information necessary to solve professional and scientific tasks in the field of finance and economic
Critically evaluate, select, and use the necessary analytical tools to create visualizations of financial and economic data	Ability to visualize financial and economic data

COURSE CONTENT

Topic 1: Basics of visualization of financial and economic data

1.1 Visualization language for financial and economic data.

Data analysis. Stages of financial data analysis. The meaning of the concept of "visualization". The importance of financial and economic data visualization in modern analytics. Data types. Elements of data visualization language. Stages of visualization construction. Combinations of language elements of visualization.

1.2. Tabular data and graphs.

Graphs and their types. Data preparation for graphing. Tools for forming and storing data sources. Spreadsheets. Graphing software. Graphing in an online environment.

1.3. Modern approaches to visualizing financial and economic data.

Charts for visualizing categorical data and quantitative indicators.

Topic 2. Visual coding of financial and economic data.

2.1. Types of graphs used to visualize financial and economic data.

Comparison. Evolution over time. Ranking. Correlation. Deviation. Distribution. Geographic data.

2.2. Visual coding. Evaluating the effectiveness of visual coding.

Perception of visual channels. The impact of visual channels on the perception of financial and economic data

Topic 3. Graphic design and factors that influence it.

3.1. Fundamentals of the theory of visual perception.

Gestalt psychology (manifestation, embodiment, multiple stability). Law of proximity. Common areas. Similarity. Closedness and completeness of the image. Symmetry. Continuation. General purpose and behavior. "Psychology" of color.

3.2. Fundamentals of graphic design.

Mnemonic rules. Space. Modular grid. Contrast. Visual weight and its evaluation. Visual direction of the composition. Focal points and hierarchy. Compositional flow, movement and rhythm. Balance. Types of balance

Topic 4. Modern tools for creating visualizations of financial and economic data.

4.1. Infographic creation tools.

Online tools for creating infographics. Offline software products for visualizing financial and economic data. Guides to the best visualizations. Influencers in the field of visualization.

4.2. Business process visualization. SADT methodology. IDEF0 notation.

Basic concepts of UML. Use case diagrams and its elements. Online platforms for visualizing business process modeling.

4.3. Infographics of the financial strategy of the enterprise.

Visualization of the results of strategic analysis of the operating environment of enterprises (SWOT, PESTLE analysis). Strategic map. Forecasting financial and economic data.

4.4. Financial and economic data dashboards.

General characteristics of dashboards. Advantages of using dashboards for visualizing financial and economic data

Тема 5. SQL basics for generating financial and economic data arrays

5.1. Basic concepts.

Hierarchical model. Relational model. Principles of work of software applications with financial data. Data types.

5.2. Formation of a sample of financial and economic data.

Requests for obtaining a sample of financial and economic data. AND/OR logic. Subqueries. Linking tables with financial data. Cross-join. Operations with sets of financial and economic data. Aggregates. Financial and economic data grouping. Syntax of a request for a sample of financial and economic data.

The list of practical classes for the discipline is given in Table 2.

Table 2

List of Practical classes/tasks

Name of topics	Contents
Topic 1	Practical task №1. Business entity activity infographics
	Practical task №2. Presentation of financial indicators of the business entity
Topic 2	Practical task №3. Infographics of macro- and microeconomic indicators
	Practical task №4. Visualization of financial reporting and economic data of business entities
Topic 3	Practical task №5. Construction of infographics of financial and economic data using visualization tools
	Practical task №6. Creation of graphs for visualization of financial and economic data
Topic 4	Practical task №7. Infographic of the results of financial and economic data forecasting
	Practical task №8. Visualization of the financial and economic data analysis results
Topic 5	Practical task №9. Creating a financial and economic data monitoring panel in the MS Excel
	Practical task №10. Creation of dashboards for financial monitoring data in the MS Power BI

The list of independent work in the discipline is given in Table 3.

Table 3

List of independent work

Name of the topic	Content
Topic 1.	Study of lecture material. Preparation for practical classes. 1. Management of financial and economic data. 2. Organization of the use of visual analytics of financial and economic data. 3. Use of visualization of financial and economic data
Topic 2.	Study of lecture material. Preparation for practical classes. 1. The relativity of financial and economic data estimates. 2. Preparation of arrays of financial and economic information for building visualization based on the results of implementing economic and mathematical models
Topic 3.	Study of lecture material. Preparation for practical classes. 1. Focal points in visualizations of financial and economic data. 2. Approaches to creating a visual hierarchy of financial and economic data
Topic 4.	Study of lecture material. Preparation for practical classes. 1. Business processes visualization for in the financial and economic sphere. 2. Notations for graphical modeling of business processes in the financial and economic sphere
Topic 5.	Study of lecture material. Preparation for practical classes. 1.Preparation of financial data arrays for building a monitoring panel in MS Power BI. 2. Queries in the MS Power BI. 3. Financial data monitoring panel in Google Looker

The number of hours of lectures, Practical work and independent work hours is given in the curriculum (technological card) for the discipline.

TEACHING METHODS

In the process of teaching the discipline, the following teaching methods are used to achieve certain learning outcomes and intensify the educational process:

Verbal (lecture (Topics 1-2), problematic lecture (Topic 3); lecture-dialog (Topics 4, 5)).

Visual (demonstration (Topics 1 - 5).

Practical classes (practical tasks (Topics 1-5).

FORMS AND METHODS OF ASSESSMENT

The University uses a 100-point cumulative system for assessing the learning outcomes of students.

Current control is carried out during lectures and practical classes and is aimed at checking the level of readiness of the student to perform a specific job and is evaluated by the amount of points scored:

for courses with a form of semester control as grading: maximum amount is 100 points; minimum amount required is 60 points.

The final control includes current control and assessment of the student.

Semester control is carried out in the form of a grading.

The final grade in the course is determined:

the final grade is the amount of all points received during the current control.

During the teaching of the course, the following control measures are used:

Current control: competence-oriented tasks on topics (maximum score – 10 points (ten competence-oriented tasks during the semester, total maximum number of points – 100)).

Semester control: Grading.

More detailed information on the assessment system is provided in the technological card of the course.

RECOMMENDED LITERATURE

Main

1. Berinato S. Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations. Harvard Business Review, 2023. 304 p.

2. Data Science in Economics and Finance for Decision Makers / Edited by P. Nymand-Andersen. 2021. 400 p.

3. Hildén J., Koponen J. Data Visualization Handbook. Aalto Arts Books, 2020. 352 p.

4. Wilke C. O. Fundamentals of Data Visualization. O'Reilly Media, 2019. 387 p.

Additional

5. Візуалізація фінансових даних. Методичні рекомендації до лабораторних робіт для студентів спеціальності 072 "Фінанси, банківська справа та страхування" другого (магістерського) рівня за освітньою програмою "ІТфінанси" / уклад. С. В. Лелюк; Харківський національний економічний університет ім. С. Кузнеця. Харків : ХНЕУ ім. С. Кузнеця, 2021. 45. URL : http://repository.hneu.edu.ua/handle/123456789/26389.

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10.4236/ajibm.2023.138047.

10. Knaflic C. N. Storytelling with Data: A Data Visualization Guide for Business Professionals. Wiley, 2015. 288 p.

11. Norman D. A. The Design of Everyday Things. MIT Press Ltd, 2014. 368 p.

12. Schwabish J. A. An Economist's Guide to Visualizing Data. J*ournal of Economic Perspective*. 2014. Volume 28, Number 1.P. 209–234. URL : http://dx.doi.org/10.1257/jep.28.1.209.

13. Suvarnapathaki S. Data Visualization for Analyzing Macroeconomic Indicators. *Journal of Statistics Applications & Probability Letters*. 2023. Vol. 10, No. 3. Pp. 125-135. DOI: 10.18576/jsapl/100301.

14. Uddin M. M., Ullah R., Moniruzzaman M. Data Visualization in Annual Reports: Impacting Investment Decisions. International Journal for Multidisciplinary Research (IJFMR). 2024. Volume 6, Issue 5. https://doi.org/10.36948/ijfmr.2024.v06i05.29149.

Information resources

15. Advanced Analytics with Power BI. URL : https://www.marquam.com/Documents/Advanced%20Analytics%20with%20Power%20BI%20White%20Paper.pdf.

16. DATA VISUALIZATION : Definition, technologies and tools. URL : https://datos.gob.es/sites/default/files/doc/file/data_visualization_tool_report.pdf

17. Chen C., Härdle W., Unwin A. Handbook of Data Visualization. URL: https://haralick.org/DV/Handbook_of_Data_Visualization.pdf.

18. Educational materials by academic discipline "Візуалізація фінансово-економічних даних (МАГ-МАЙНОР) " on the website of personal learning systems of the S. Kuznets KhNUE. URL : https://pns.hneu.edu.ua/course/view.php?id=10596

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20. Introduction to Data Visualization Techniques Using Microsoft Excel 2013 & Web-based Tools. URL : https://sites.tufts.edu/gis/files/2016/02/Introduction_to_Data_Visualization.pdf.

21. Kling A., Westgate M. Data Visualization for Financial Services: A Pragmatic Approach to Harnessing Business Insight. URL : https://www.financialview.media/uploads/resources/resources/429202112613AM_Resource_DataVisualizationForFinancialServices.pdf

22. Looker introduction. URL: https://cloud.google.com/looker/docs/intro.

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