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

ЗАТВЕРДЖЕНО
на засіданні кафедри
фінансів і кредиту
Протокол № 8 від 14.01.2025 р.

ПОГОДЖЕНО
Проректор з навчально-методичної роботи

_____ Каріна НЕМАШКАЛО

BUSINESS INTELLIGENCE у фінансах

робоча програма навчальної дисципліни (РПНД)

Галузь знань   **D "Бізнес, адміністрування та право"**
Спеціальність   **D2 "Фінанси, банківська справа, страхування та фондовий ринок"**
Освітній рівень   **другий (магістерський)**
Освітня програма   **"Фінанси і кредит"**

Статус дисципліни   **Обов'язкова**
Мова викладання, навчання та оцінювання   **Англійська**

Розробники:
к.е.н,
доцент   Марина БЕРЕСТ

к.е.н,
доцент   Світлана ЛЕЛЮК

Завідувач кафедри
фінансів і кредиту   Ірина ЖУРАВЛЬОВА

Гарант освітньої програми   Ірина ЖУРАВЛЬОВА

**Харків
2025**

APPROVED
at the meeting the Department
of Finance and Credit
Protocol № 8 dated January 14, 2025

AGREED
Vice-rector for educational and methodical work

_____ Karina NEMASHKALO

№02071211

BUSINESS INTELLIGENCE in Finance

Program of the course

Field of Knowledge	**D «Business, administration and law»**
Specialty	**D2 «Finance, banking, insurance and stock market»**
Study cycle	**second (master's)**
Study programme	**«Finance and Credit»**

Course status	**Mandator**
Language	**English**

Developers:
academic degree,
academic title
academic degree,
academic title

Maryna BEREST

Svitlana LELIUK

Head of the Department
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Head of Study Programme

Iryna ZHURAVLYOVA

:

Kharkiv
2025

INTRODUCTION

The academic discipline "BUSINESS INTELLIGENCE in Finance" belongs to the cycle of professional and practical training, belongs to the group of compulsory 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 analyzing, processing and systematizing arrays of financial information to developing relational databases in MS Access, implementing work in environments for creating dashboards for corporate information systems of business entities.

The purpose of the discipline "BUSINESS INTELLIGENCE in Finance" is to develop in-depth knowledge and skills of existing information systems and digital technologies for processing and accounting of financial 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 automated analysis of financial and economic information, the peculiarities of the functioning of information in automated information systems, the formation of theoretical and practical knowledge of financial calculations using tabular databases, the formation of knowledge of the use of modern tools for the formation of financial data arrays and dashboards for tracking them.

The subject of the discipline is BUSINESS INTELLIGENCE tools that provide processing of financial and economic information.

The object of the discipline is the process of studying digital BUSINESS INTELLIGENCE technologies used to process database information, 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
LO04	SC7, SC9
LO05	GC2, GC8
LO08	SC8, SC9
LO09	SC9
LO10	SC6, SC7
LO15	GC2, SC11

LO04. Search for, process, systematize and analyze information necessary for solving professional and scientific problems in the field of finance, banking, insurance and the stock market.

LO05. Communicate fluently in a foreign language orally and in writing on professional and scientific issues, present and discuss research results.

LO08. Be able to apply and manage innovative approaches in the field of finance, banking, insurance and the stock market.

LO09. Apply management skills in the field of finance, banking, insurance and stock market.

LO10. Carry out diagnostics and modeling of financial activities of economic entities.

LO15. Apply BI (Business Intelligence) tools to organize quick access to heterogeneous data from various sources, process it, and visualize it to support financial decision-making.

SC6. Ability to apply interdisciplinary approaches in solving complex problems and issues in the field of finance, banking, insurance and stock market.

SC7. Ability to search, use and interpret information necessary for solving professional and scientific problems in the field of finance, banking, insurance and stock market.

SC8. Ability to apply innovative approaches in the field of finance, banking, insurance and stock market.

SC9. Ability to develop technical specifications for the design of information systems in the field of finance, banking, insurance and stock market.

SC11. The ability to provide quick access to heterogeneous data from various sources, their processing and visualization to support financial decision-making using a BI (Business Intelligence) tool.

GC2. Ability to communicate in a foreign language.

COURSE CONTENT

Topic 1: Introduction to Data Analysis
1.1 Data Analysis iteration.

Epicycles of Analysis. Setting the Scene. Five core activities of data analysis. Setting expectations. Collecting information (data), comparing the data to expectations. Revising expectations or fixing the data. Applying the epicycle of analysis process.

1.2. Stages of Data Analysis.

Stating and refining the question. Exploring the data (EDA). Building formal statistical models. Interpreting the results. Communicating the results.

1.3. Types of question in a Data Analysis.

Stating and refining the question. Types of questions. Possible audience Descriptive, exploratory, inferential, predictive, causal, mechanistic questions. Applying the epicycle to stating and refining question. Establishing expectations about the question. Gathering information about question. Determining and refining question. Characteristics of a good question: interest to audience, not already been answered, plausible, answerable, specificity. Translating a question into a data problem.

Topic 2. The essence and areas of activity of BI - analytics.

2.1. What is Business Intelligence (BI).

The essence and tasks of BI. The main purpose of BI. Basic operational and srategic business decisions. External and internal data. The main directions of BI systems development: data storage, data integration, data analysis, data visualization.

2.2. The role of a BI-analyst.

The business intelligence analyst job description. Stages of activity of a BI-analyst. Required professional and soft skills of a BI-analyst. A responsibility of a BI-analyst. The main purpose of a BI-analyst activity.

2.3 BI-tools.

The functions, strategies, and tools companies use to collect, process, and analyze data. Structured and unstructured data. Data sources. Internal and external systems. Functions of BI-tools. Benefits of BI tools. Microsoft Visio. Microsoft Excel. Tableau. Microsoft Power BI.

Topic 3. Construction and analysis of statistical models in the process of data analysis.

3.1. Using models to explore data.

The essence and purposes of using statistical models in data analysis. Iterative process of model building. Setting expectations. Collecting Information. Applying the normal model. Comparing model expectations to reality. Reacting to data: refining our expectations.

3.2. Statistical modeling techniques

The essence and content of statistical modeling. Two categories of statistical modeling: supervised vs. unsupervised learning. Regression model. Classification model. K-means clustering. Principal component analysis (PCA). Using models for forecasting.

Topic 4. SQL basics for generating financial data arrays.

5.1. Basic concepts. Hierarchical model. Relational model. Principles of software applications with financial data. Data types.

5.2. Forming a financial data sample. Financial data sample queries. AND/OR logic. Subqueries. Linking financial data tables. Cross-join. Financial data set operations. Aggregates. Financial data grouping. Financial data sample query syntax.

Topic 5. Using BI tools to solve business intelligence tasks

5.1. The essence and content of Business intelligence (BI). Business analysis (content, processes, stages). Features of implementing Business intelligence. Business analytics. The difference between business analysis and business intelligence. The importance of business analysis. Advantages of implementing business analysis activities.

5.2. Types of Business intelligence tools. Ad hoc analysis. Online analytical processing (OLAP). Mobile Business intelligence technologies. Real-time analytics. The best modern BI tools. Evaluation of BI tools.

The list of laboratory work for the discipline is given in Table 2.

<div align="right">Table 2</div>

List of laboratory classes/tasks

Name of topics	Contents
Topic 1.	Laboratory work №1. Formation of a database in MS Excel on the topic of analytical research
Topic 2.	Laboratory work № 2. Analytical study of the data set
Topic 3.	Laboratory work № 3. Building statistical models for data analysis and forecasting.
Topic 4.	Laboratory work 4. Formation of data arrays using SQL
Topic 5.	Laboratory work 5. Data preparation and modeling in the MS Power BI environment

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

<div align="right">Table 3</div>

List of independent work

Name of topics	Contents
Topic 1.	Studying lecture material, preparing for a laboratory class, forming a database in the analytical area
Topic 2.	Studying lecture material, preparing for a laboratory class. Performing an individual task «Analytical study of the data set»
Topic 3.	Studying lecture material, preparing for a laboratory class. Performing an individual task «Building statistical models for data analysis and forecasting»
Topic 4.	Studying lecture material, preparing for a laboratory class. Performing an individual task «Formation of data arrays using SQL»
Topic 5.	Studying lecture material, preparing for a laboratory class. Performing an individual task «Data preparation and modeling in the MS Power BI environment»

The number of hours of lectures, practical (seminar) 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 2, 5)).

Visual (demonstration (Topics 1 - 5).

Laboratory classes (laboratory work (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 laboratory 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:

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 – 14 points (five competence-oriented tasks during the semester, total maximum number of points – 70)); final control work (maximum score – 30 points).

Semester control: Grading.

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

RECOMMENDED LITERATURE

Main

1. Проноза П. В., Лелюк С. В. Системи підтримки прийняття антикризових фінансових рішень : навчальний посібник. Харків : ХНЕУ ім. С. Кузнеця, 2019. 117 с. URL :http://repository.hneu.edu.ua/bitstream/123456789/21442/1/2019-5-%D0%95%D0%9D%D0%9F%20%D0%9F%D1%80%D0%BE%D0%BD%D0%BE%D0%B7%D0%B0%20%D0%9F%20%D0%92%2C%20%D0%9B%D0%B5%D0%BB%D1%8E%D0%BA%20%D0%A1%20%D0%92.pdf

2. Loshin D. Business Intelligence THE SAVVY MANAGER'S GUIDE Getting Onboard with Emerging IT. Morgan Kaufmann Publishers, 2003. 292 p.

Additional

3. Алексєєнко І. І. Управління проєктами та вартістю підприємства в умовах цифровізації: аналіз бізнес-процесів і візуалізація фінансових даних / І. І. Алексєєнко, С. В. Лелюк, О. П. Полтініна // Цифрова економіка як фактор економічного зростання держави : колект. монографія. Херсон : Гельветика, 2021. С. 80-98. URL : http://repository.hneu.edu.ua/handle/123456789/27824.

4. Лелюк С., Алексєєнко І., Полтініна О. Візуалізація даних в управлінні проектами фінансової сфери. *Економіка та суспільство*. 2021. Випуск #26/2021. URL: http://repository.hneu.edu.ua/bitstream/123456789/26119/1/2.pdf

5. Сучасні інформаційні технології та системи [Електронний ресурс] : монографія / Н. Г. Аксак, Л. Е. Гризун, О. В. Щербаков [та ін.] ; за заг. ред.

Пономаренка В. С. Харків : ХНЕУ ім. С. Кузнеця, 2022. 270 с. URL : http://repository.hneu.edu.ua/handle/123456789/29233

6. Abduldaem A, Gravell A. Success Factors of Business Intelligence and Performance Dashboards to Improve Performance in Higher Education. *In Proceedings of the 23rd International Conference on Enterprise Information Systems (ICEIS 2021).* Volume 2, pages 392-402. URL : https://www.scitepress.org/PublishedPapers/2021/104995/104995.pdf.

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

8. Agiu D., Mateescu V., Muntean Iu. Business Intelligence overview. *Database Systems Journal.* 2014. Vol. V, No. 3/2014. Pp. 23-36.

9. Aleksieienko I. Modeling business processes of making financial decisions using digital technologies / I. Aleksieienko, S. Leliuk. - Transformational economy: theoretical and practical aspects : Collective monograph. Riga, Latvia: Baltija Publishing, 2024. P. 383-402. URL : http://www.repository.hneu.edu.ua/handle/123456789/35238

10. Berest M., Sablina N. Evaluation of the effectiveness of strategic and tactical controlling based on the analysis of the company's financial reports. Development Management. 2024. 23(1). P. 8-18. URL : http://repository.hneu.edu.ua/handle/123456789/35284.

11. Bataweel D. S. Business Intelligence: E Business Intelligence: Evolution And F olution And Future Trends. Theses. 2015. 283 p. URL : https://core.ac.uk/download/pdf/327255786.pdf.

12. Creating Visualizations using Microsoft Power BI. URL : https://home.ictp.it/Members/oayub/Lecture-2.pdf.

13. Gad-Elrab A.A. Modern Business Intelligence: Big Data Analytics and Artificial Intelligence for Creating the Data-Driven Value. *E-Business - Higher Education and Intelligence Applications.* 2021. DOI: http://dx.doi.org/10.5772/intechopen.97374

14. Roger D. Peng and Elizabeth Matsui. The Art of Data Science: A Guide for Anyone Who Works with Data. 2017**.** URL : https://bookdown.org/rdpeng/artofdatascience/

Information resources
15. Educational materials by academic discipline "BUSINESS INTELLIGENCE in Finance" on the website of personal learning systems of the S. Kuznets KhNUE. URL : https://pns.hneu.edu.ua/enrol/index.php?id=10252

16. Get started with Power BI Desktop. URL : https://learn.microsoft.com/en-gb/power-bi/fundamentals/desktop-getting-started

17. State Statistics Service of Ukraine. URL : http://www.ukrstat.gov.ua

18. Ministry of Finance of Ukraine. URL: https://www.mof.gov.ua/uk/

19. National Bank of Ukraine. URL: https://bank.gov.ua