Ministry of Education and Science of Ukraine
National Aerospace University
"Kharkiv Aviation Institute"

Department of Economics and Public Administration (No. 601)

APPROVE

Guarantor of the educational program



(підпис) Oleksandr POPOV (ініціали та прізвище)

"31" August 2026

SYLLABUS OF THE MANDATORY COURSE

Analytics and cost optimization

(name of the course)

Field of knowledge: C "Social Sciences, Journalism, Information and International Relations"
(code and name of the field of knowledge)

Specialty: C1 "Economics and International Economic Relations"
(code and name of the specialty)

Educational program: "SMART-economics"
(name of the educational program)

Level of higher education: first (bachelor's degree)

The syllabus is effective from 01.09.2026

Kharkiv – 2026

Developer: Professor of Department 601,

Doctor of Public Administration, Full Professor  Victoriia SHVEDUN

(position, academic degree and title, first and last name (signature)

The syllabus of the academic discipline was considered at the meeting of the Department of Economics and Public Administration (No. 601)

Protocol No. 1 dated "31" August 2026.

Head of the Department

Dr. of Public Administration, Prof.  Victoriia SHVEDUN

(academic degree and academic title) (signature) (first name and SURNAME)

Agreed with the representative of education seekers:

 Yaroslava CHORNA

(signature) (initials and surname)

1. General information about the teacher



Shvedun Viktoriya Oleksandrivna, Doctor of Public Administration, Professor. Teaches the following disciplines at the university:
- Public Administration in the Economic Sphere;
- European Integration Policy;
- Statistics;
- Microeconomics;
- Analytics and Cost Optimization;
- Leadership and Teamwork

Areas of scientific research:
public administration in the sphere of ensuring national security, state regulation of advertising activities, state regulation of the tourism sector, international public administration and European integration.

2. Description of the academic discipline

Form of education	*Full-time, part-time*
Semester	3
Language of instruction	English
Type of discipline	Required
Course volume: ECTS credits/number of hours	*full-time:* 3 ECTS credits / 90 hours (48 classroom hours, of which: lectures – 32 practical – 16; SRZ – 42); *part-time:* 3 ECTS credits / 90 hours (6 classroom hours, of which: lectures – 2, practical – 4; SRZ – 82)
Types of educational activities	Lectures, practical (seminar) classes, independent study
Types of control	Continuous assessment, module assessment, semester assessment – exam
Prerequisites	Political Economy, Development of Economic and Managerial Outlook
Co-requisites	Enterprise Economics, Statistics, Finance, Management
Post-requisites	Accounting

3. Aim and objectives of the academic discipline

Aim: to develop in students a systematized body of knowledge regarding cost classification and allocation; methods for planning, accounting for, controlling, and analyzing costs; making management decisions based on cost analysis; and building on this practical skills for effective production management.

Objectives: for students to acquire knowledge regarding the patterns of cost formation, procedures for planning, accounting, and control, and mechanisms for cost analysis aimed at minimizing cost levels and increasing efficiency; and to develop practical skills in effective production management based on current and strategic cost management.

In accordance with the requirements of the educational-professional program, students must achieve the following competencies:

general:

Ability to apply knowledge in practical situations;

Ability to communicate in the state language, both orally and in writing;

Skills in using information and communication technologies;

Ability to make well-founded decisions;

Ability to make decisions and act in adherence to the principle of zero tolerance for corruption and any other manifestations of dishonesty.

professional:

Ability to use computer technologies and data processing software to solve economic problems, analyze information, and prepare analytical reports;

Ability to analyze and solve problems in the sphere of economic and socio-labor relations;

Ability to forecast socio-economic processes based on standard theoretical and econometric models;

Ability to substantiate economic decisions based on an understanding of the patterns of economic systems and processes and through the application of modern methodological tools; Ability to independently identify economic issues when analyzing specific situations and propose solutions.

Program learning outcomes:

1. Analyze the functioning and development of business entities, identify functional areas, and calculate relevant indicators characterizing their performance.
2. Identify sources and understand the methodology for determining and the methods for obtaining socio-economic data; collect and analyze necessary information; and calculate economic and social indicators.
3. Identify and plan opportunities for personal professional development.

4. Course Content

Module 1.

Content Module 1. Theoretical and Methodological Foundations of Cost Management.

TOPIC 1. Economic essence, significance, and objectives of cost management.

– *form of instruction:* lecture, practical class, independent study.

– *brief summary:*

The concept of "costs." Types of costs. Diversity of costs and their grouping based on specific criteria;

– *practical class topic:* "Economic essence, significance, and objectives of cost management";

– *required items and resources (equipment, machinery, materials, tools):* computer equipment, projector;

– *topics for student independent study:*

Various approaches to determining cost structure and their practical significance. Cost structure by type (elemental structure) and its specific features across different economic sectors.

TOPIC 2. Characteristics, classification, and structure of costs.

– *form of instruction:* lecture, practical class, independent study.

– *brief summary:*

Costs and production cost (cost price). Cost classification and its practical significance. Practical application of cost classification in managing cost dynamics and making business decisions. Cost structure and the factors determining it;

– *practical class topic:* "General classification and structure of costs";

– *required items and resources (equipment, machinery, materials, tools):* computer equipment, projector;

– *topics for student independent study:*

Cost structure based on responsiveness to the scale of business activity; using this information to substantiate business decisions.

TOPIC 3. Cost Management System.

– *form of instruction:* lecture, practical session, independent study.

– *brief summary:*

Functions and structure of the cost management system. Cost management as the process of purposefully shaping costs categorized by type, location, and cost object—while continuously monitoring their levels and incentivizing reductions. The importance of substantiating cost levels and controlling cost formation by responsibility center. The functional aspect of the cost management system. Organizational cost management systems within enterprises. Managerial and financial

(fiscal) aspects of cost formation. Product cost as the basis for pricing and the lower price limit;

– *practical session topic:* "Cost Management System";

– *required items and resources (equipment, machinery, materials, tools):* computer hardware, projector;

– *topics for student independent study:*

Specifics of the lower price limit in the short and long term. The relationship between profit and cost levels. The impact of variable and fixed costs on profit magnitude. Minimization of costs associated with the enterprise's core operations.

Module Assessment 1

– format: in-class module test (remote administration permitted at the lecturer's discretion);

Content Module 2. Cost Formation and Calculation.

TOPIC 4. Cost Formation by Location and Responsibility Center.

– *form of instruction:* lecture, practical session, independent study.

– *brief summary:*

Cost locations and responsibility centers. The purpose of differentiating costs by formation location and responsibility center: cost control, assigning personal accountability for cost levels, and improving the accuracy of cost calculations by cost object. Requirements for organizing responsibility centers. Functional and territorial criteria for organizing responsibility centers. Departmental budgets. Composition of costs at points of origin across different hierarchical levels. Methodology for preparing budgets for departments with various functional purposes: primary (sections, workshops), auxiliary, and service units. Specifics of production department budgets under semi-finished product and non-semi-finished product cost calculation methods;

– *practical session topic:* "Cost Formation and Calculation";

– *required items and resources (equipment, machinery, materials, tools):* computer hardware, projector;

– *topics for independent study:*

Flexible departmental budgets. Allocation of costs for auxiliary and service departments when preparing budgets. Cost allocation methods: direct allocation, step-down (repeated) allocation, and the system of equations method.

TOPIC 5. Cost Calculation as a Basis for Production Cost Management.

– *format:* lecture, practical session, independent study.

– *brief summary:*

The role and methods of cost calculation in cost management. Costing based on partial (variable) and full (absorption) costs. Dependence of costing methods on production characteristics. Specifics of costing in single-product vs. multi-product manufacturing and in production involving complex raw material processing. Calculating unit cost in single-product and multi-stage production. Indirect cost

allocation bases and conditions for their application. Costing in complex (joint) production processes;

– *practical session topic:* "Methodological principles of calculating the cost of individual products";

– *required items and resources (machinery, equipment, materials, tools):* computer equipment, projector;

Topics for independent study by the student:

The problem of allocating joint costs among jointly produced products. Allocation of joint costs based on a single physical measure of production volume.

TOPIC 6. Analysis of the "cost-volume-profit" (CVP) system as a tool for substantiating production and marketing decisions.

– *format of classes:* lecture, practical session, independent study.

– *brief abstract:*

Essence and prerequisites of "cost-volume-profit" (CVP) analysis. The relationship between costs, production volume (operating activity), and profit. Economic significance of modeling and analyzing this relationship. Simplified linear model of CVP analysis and its graphical interpretation. Indicators calculated and analyzed in CVP analysis. Classification of costs into variable and fixed. Role of contribution margin in analysis and decision-making. Analysis of equilibrium and safety of operating activity. Equilibrium (break-even) volume of operating activity (production). Operating leverage: definition and application in operational analysis;

– *topic of practical session:* "Analysis of the 'cost-volume-profit' system as a tool for substantiating production and marketing decisions";

– *required items and resources (equipment, machinery, materials, tools):* computer equipment, projector;

– *topics for independent study by the student:*

Calculation of the enterprise's economic safety level. Dependence of profit on operating activity and cost structure. The significance of managing profit and the factors that determine it.

TOPIC 7. Cost control and incentivizing resource-saving economies.

– *format:* lecture, practical session, independent study.

– *brief summary:*

Accounting and reporting as elements of cost control. Organizational structure of the cost accounting and material flow system. Differentiation and comprehensiveness in accounting for controllable costs by their point of origin. Cost control methods. Conditions for comparing actual and planned costs over a specific period. Specifics of controlling cost levels under a standard costing system. Accounting for and analyzing variances between actual and standard costs by responsibility center;

– *practical session topic:* "Cost control and incentivizing resource savings";

– *required items and resources (equipment, machinery, materials, tools):* computer hardware, projector;

– *topics for independent study:*

Incentivizing resource savings. Forms of incentives based on the magnitude of savings available for cost-reduction bonuses. Distribution of bonuses among participants in cost-saving initiatives.

TOPIC 8. Minimizing production inventory costs.

– *format:* lecture, practical session, independent study.

– *brief summary:*

Optimization of inventories and material flows. Costs associated with material delivery and warehousing; their dependence on delivery volume and intervals. Methods for valuing inventory materials upon release to production, sale, or other forms of disposal. The essence and conditions for the effective application of valuation methods: First-In, First-Out (FIFO), Last-In, First-Out (LIFO), weighted average cost, standard cost, specific identification cost, and selling price. Alternatives for equipment acquisition: purchase (using own funds or credit) and leasing;

– *practical session topic:* "Minimizing inventory costs";

– *required items and resources (machinery, equipment, materials, tools):* computer hardware, projector;

– *topics for independent study:*

Adapting the operating system to changes in workload. Operating costs as a criterion for adapting the operating system to workload changes. Parameters, forms, and mechanisms for adapting core equipment.

Module Assessment 2

– format: in-class module test (may be conducted remotely at the lecturer's discretion);

Module 2

Individual assignment – calculation project: "Calculation of Planned Cost Indicators for a Manufacturing Enterprise":

– required items and resources (machinery, equipment, materials, tools): computer hardware;

5. Individual assignments

Completion of the calculation project "Calculation of Planned Cost Indicators for a Manufacturing Enterprise" based on assigned variants.

6. Teaching methods

Verbal (explanations, narration, conversation, educational discussion, etc.); visual (illustration, demonstration); and practical (practical exercises, individual questioning, testing).

7. Assessment methods

Ongoing, interim, and final (semester) assessment.

Ongoing assessment takes place during practical classes in the form of theoretical questioning and the solution of practical tasks.

Interim assessment is conducted via testing covering specific sections of the course.

Final (semester) assessment is conducted in oral and written forms, covering course topics and the defense of the individual assignment (calculation project).

Semester assessment – exam.

8. Evaluation criteria and distribution of points received by applicants

Table 8.1 – Distribution of points received by education seekers

Components of educational work	Points for one lesson (task)	Number of lessons (tasks)	Total points
Content module 1			
Work during practical classes	0 . . 2	3	0 . . 6
Completion of assessment tasks	0 . . 4	4	0 . . 16
Module assessment	0 . . 20	1	0 . . 19
Content module 2			
Practical classwork	0 . . 2	4	0 . . 8
Completion of assessment tasks	0 . . 4	4	0 . . 16
Completion and defense of the term project	0 . . 15	1	0 . . 15
Module assessment	0 . . 20	1	0 . . 20
Total per semester			**0 . . 100**

During the semester, a student can earn up to 10 bonus points. Points may be awarded for the following activities:

– active participation in lectures and practical classes: 0–5 points;

– writing abstracts for scientific and practical conferences: 0–10 points.

If the maximum score (100 points) is exceeded, the student will receive 100 points.

Table 8.2 – Rating scales: point and traditional

Total points	Traditional scale rating	
	Exam, differential credit	**Test**
90 – 100	Perfectly	Enrolled
75 – 89	Good	
60 – 74	Satisfactorily	
0 – 59	Unsatisfactorily	Not included

The semester assessment (exam) is conducted if the student declines the marks obtained from continuous assessment and has been cleared to take the exam. Students can earn a maximum of 100 points on the semester exam.

The exam consists of two theoretical questions (with a maximum of 30 points each) and one practical question (problem), worth a maximum of 40 points.

Table 8.3 – Criteria for evaluating the work of a student during the semester

Score	Explanation
90-100	Subject to in-depth study of the educational material, which is confirmed by comprehensive answers to questions and the application of the acquired knowledge in practice: correct, error-free completion of tasks in practical classes and calculation work (PP) within the deadlines established by the educational schedule
83-89	Provided that the educational material is firmly mastered, when answering questions, the student does not make serious mistakes, is able to apply the acquired knowledge in practice (in tasks in practical classes), performs RR correctly, without errors
75-82	Subject to the firm mastering of the educational material, when answering questions, the student does not make serious mistakes, is able to apply the acquired knowledge in practice (tasks in practical classes and RR are performed with minor errors)
68-74	Subject to the mastering of the educational material, the student does not answer questions completely and not accurately enough, but is able to apply the acquired knowledge in practice (when performing tasks in practical classes and RR, he makes less than 60% of errors)
60-67	Subject to the fulfillment of the minimum criteria of knowledge and skills, the student has mastered the basic program material, makes mistakes when performing tasks in practical classes, in RR, but has the necessary knowledge to eliminate them under the guidance of the teacher
0-59	Subject to the fact that the student has not mastered all the basic educational material, makes serious mistakes when performing tasks in practical classes and RR, does not have necessary knowledge to eliminate them under the guidance of a teacher

9. Course Policy

When studying the discipline, it is necessary to rely on lecture notes and recommended educational and scientific literature. The use of various sources with alternative views on certain issues is welcome in order to form a productive discussion on the problems of the academic discipline.

The following indicators of academic activity and additional educational achievements of higher education applicants are taken into account:

– answers to questions from the practical lesson plan during the lesson;

– reports on problematic issues of the practical lesson;

– participation in active forms of learning in practical lessons;

– development of thematic presentations;

– publication of abstracts of reports and participation in conferences, writing scientific articles, abstracts;

– working out the topics of missed practical lessons;

– other achievements in the educational sphere, which are confirmed by documents (diplomas, diplomas, certificates, etc.).

Attendance policy. Attendance at classes is a mandatory component of assessment. The desire of higher education applicants to systematically and systematically learn the educational material, actively work in practical classes, participate in the discussion of discussion issues, fully participate in active forms of learning, and work through missed practical classes is highly appreciated. For objective

reasons (for example, illness, international internship), training may take place remotely in agreement with the course leader.

Retake policy. Works submitted after the deadline without good reason are evaluated with a lower grade (-1 point). Modules are retaken with the permission of the dean's office if there are good reasons (for example, sick leave).

Academic integrity policy. A higher education applicant acts in accordance with the Code of the National Aerospace University "Kharkiv Aviation Institute" "On Academic Integrity".

The main types of violations of academic integrity for the discipline:

1. Self-plagiarism: re-submission by students of written works that have already been submitted as reports from other disciplines (abstracts).

2. Fabrication:

– citing fictitious or unverified data in written works and scientific works, in particular statistical data, calculations or empirical studies;

– references to fictitious sources of information or deliberate reference not to a real source.

3. Falsification:

– unfounded performance of educational tasks;

– citing deliberately changed data and calculations in written works and scientific works;

4. Cheating:

– writing other people's versions of tasks at tests;

– non-independent performance of tasks.

The main type of responsibility of students for violating academic integrity in this discipline is re-taking the assessment of the corresponding test.

Plagiarism during current testing, module controls and exams is prohibited (including using mobile devices).

The test paper must demonstrate the achievement of learning outcomes specified in the educational program, the author's ability to logically, based on modern scientific methods, express his views on the topic of the work, justify the choice of software, draw reasonable conclusions and formulate specific proposals regarding the results obtained. The paper must not contain plagiarism, fabrication and falsification.

10. Methodological support and information resources

Textbooks, study guides, teaching aids, lecture notes, guidelines for practical work, etc., published by the University, are available at the following link:

1. Klymenko, T. A. Cost Management: Theory, Tasks, Tests [Electronic resource] : study guide / T. A. Klymenko. – Kharkiv : National Aerospace University "Kharkiv Aviation Institute", 2018. – 106 p. – http://library.khai.edu/library/fulltexts/metod/.

The course webpage is available at the following link: https://mentor.khai.edu/course/

11. Recommended Literature

Core

1. Akhnovska I., Bolhov V. Cost Management: Study Guide / I. O. Akhnovska, V. Ye. Bolhov. Vinnytsia: Vasyl Stus DonNU, 2020. 156 p. [Electronic resource]. – Access mode: https://r.donnu.edu.ua/bitstream/123456789/943/1/58_Управління%20витратами_I.pdf

2. Matvieieva N. M. Cost Management: Study Guide / N. M. Matvieieva, O. I. Slavuta; O. M. Beketov National University of Urban Economy in Kharkiv. – Kharkiv: O. M. Beketov NUUEK, 2020. – 157 p. [Electronic resource]. – Access mode: https://eprints.kname.edu.ua/57428/1/2019%20печ.%2029Н%20НП%20Управління%20витрат%20от%20редактора.doc.pdf

3. Kushnir O. K. "Cost Management": Educational and Methodological Guide / O. K. Kushnir. Kamianets-Podilskyi: Publisher O. V. Kovalchuk, 2020. 122 p. [Electronic resource]. – Access mode: http://elar.kpnu.edu.ua/xmlui/bitstream/handle/123456789/3778/Kushnir-O.K.-Upravlinnia-vytratamy.pdf?sequence=1&isAllowed=y

4. Horngren C. T., Datar S. M., Rajan M. V. Cost Accounting: A Managerial Emphasis. 17th ed. Pearson, 2021.

5. Drury C. Management and Cost Accounting. 11th ed. Cengage Learning, 2021.

6. Blocher E. J., Stout D. E., Juras P. E., Cokins G. Cost Management: A Strategic Emphasis. 9th ed. McGraw-Hill Education, 2022.

7. Sharda R., Delen D., Turban E. Business Intelligence, Analytics, and Data Science: A Managerial Perspective. 5th ed. Pearson, 2024.

8. Provost F., Fawcett T**.** *Data Science for Business*. 2nd ed. O'Reilly Media, 2023.

Supplementary

1. Artamonova N.S., Akuliushyna M.O. Cost Management. – Study guide – Kyiv : Center for Educational Literature, 2018. – 120 p.

2. Holov S. F. Management Accounting: Textbook – Kyiv: Center for Educational Literature, 2019. – 400 p.

3. Tarasenko S. I. Cost Management : study guide / S. I. Tarasenko. – Kamianske : DSTU, 2018. – 305 p.

4. Enterprise Cost Management : study guide / Ed. by H. A. Kraiukhin. – Kyiv : "Business-Press" Publishing House, 2019. – 276 p.

5. Hilton R. W., Platt D. E. *Managerial Accounting: Creating Value in a Dynamic Business Environment*. 13th ed. McGraw-Hill Education, 2022.

6. Weygandt J. J., Kimmel P. D., Kieso D. E. *Managerial Accounting: Tools for Business Decision Making*. 10th ed. Wiley, 2022.

12. Information resources

1. Official portal of the Verkhovna Rada of Ukraine. [Electronic resource]. – Access mode: www.rada.gov.ua/

2. State Statistics Service of Ukraine. [Electronic resource]. – Access mode: www.ukrstat.gov.ua/

3. Official website of the "Liga Zakon" legal portal. [Electronic resource]. – Access mode: http://www.ligazakon.ua/

4. Tax Code of Ukraine [Electronic resource]. – Access mode: https://zakon.rada.gov.ua/laws/show/2755-17#Text

5. National Accounting Regulations (Standards): [Electronic resource] – Access mode: https://buhgalter911.com/normativnaya-baza/instr-plan-rah/standartbuhgalterskogo/

6. Website of the Ministry of Economy of Ukraine [Electronic resource] – Access mode: www.me.gov.ua