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

Digital Technologies of Production and Sales Management

(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:* 4.5 ECTS credits / 135 hours (48 classroom hours, of which: lectures – 16, practical – 32; SRZ – 87); *part-time:* 4.5 ECTS credits / 135 hours (8 classroom hours, of which: lectures – 2, practical – 4; SRZ – 129)
Types of educational activities	Lectures, practical classes, independent work of the applicant
Types of control	Current control, module control, semester control – credit
Prerequisites	Development of an economic worldview, mathematics for economists, microeconomics, marketing and computer science
Co-requisites	Statistics, finance, business economics, management
Post-requisites	Analytics and cost optimization, data analytics in economics, e-commerce, digital tools of economics and public administration, bachelor's thesis

3. The goal and objectives of the academic discipline, lists of competencies and expected learning outcomes

The goal is to acquire knowledge about the theoretical and practical foundations of digital technologies in economics and management, as well as the principles of organizing work with specialized tool packages MS EXCEL and MAPLE, which correspond to the classical application - automation of implemented work.

The task is to consider the theoretical and practical foundations of digital technologies in the field of economics and management, systematic evaluation of economic and management information, making economically sound decisions in the aerospace industry.

Competencies that are acquired:

Integral competence:

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)

After completing this program, the student will be able to:

– the ability to apply knowledge in practical situations;

– ability to communicate in a foreign language;

– skills in using information and communication technologies;

– ability to search, process and analyze information from various sources;

– ability to make informed decisions;

– ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special competencies (SC)

After completing this program, the student will be able to:

– ability to apply economic and mathematical methods and models to solve economic problems;

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

– ability to use modern digital technologies and data analysis tools to make informed economic decisions in the context of economic transformation.

Program learning outcomes (PLO):

– analyze the functioning and development of business entities, determine functional areas, calculate relevant indicators that characterize the effectiveness of their activities;

– identify and plan opportunities for personal professional development;

– use information and communication technologies to solve socio-economic problems, prepare and present analytical reports;

– implement the concept of a smart economy, applying the S.M.A.R.T. principles in the processes of economic analysis, strategic planning, resource management and effective decision-making in the context of digital transformation and sustainable development.

4. Content of the academic discipline

Module 1

Content module 1. Spreadsheet organization.

TOPIC 1. Introduction to the academic discipline "Digital technologies of production and sales management".

– *brief summary:*

Subject of study and objectives of the discipline. Types of classes and their volumes, organization of classes, requirements for students;

– *form of classes:* lecture;

– *topic of practical class:* none;

– *independent work of the student:* processing of lecture material.

TOPIC 2. Software in economics and management.

– *brief summary:*

Purpose of digital technologies in economics and management. Classification of PC software. Spreadsheet processors. Problems solved using spreadsheets. Basic capabilities of the MS EXCEL spreadsheet processor. Starting and ending a work session in the MS EXCEL environment;

– *form of classes:* lecture;

– *topic of practical class:* none;

– *independent work of the student:* processing the lecture material.

TOPIC 3. Organization of a spreadsheet and its elements.

– *brief summary:*

Image of a spreadsheet (SP) on the monitor screen. Toolbars. Organization of the SP workspace. Actions with SP as with a book. Selecting columns, rows, ranges. Working with three-dimensional ranges;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Introduction to the MS EXCEL spreadsheet processor. Data entry";

– *independent work of the student:* processing the lecture material.

TOPIC 4. Data types in a spreadsheet.

– *brief summary:*

Entering data into a table. Entering formulas. Complex functions. Using the Function Wizard. Entering data into a range. Editing formulas. Classification of types and styles of references. Description of references in formulas. Using range names and formula names. Processing errors returned by formulas;

– *form of classes:* lecture;

– *topic of practical lesson:* none;

– *independent work of the student*: processing of lecture material.

TOPIC 5. Actions with ranges, rows and columns of a spreadsheet.

– *brief annotation:*

Editing cells. Setting column width and row height. Copying, moving and setting rows, columns and ranges. Deleting and clearing rows, columns and ranges. Managing calculations in a table. Displaying sheet formulas on the screen. Converting formulas to values;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Technology of developing a spreadsheet";

– *independent work of the student:* processing of lecture material.

TOPIC 6. Formatting a spreadsheet worksheet.

– *brief annotation:*

Defining the formatting of ET objects. Creating an ET user format. Formatting numbers. Formatting date and time. Formatting a cell. Character attributes. Font concepts. Alignment, frames, coloring. Hiding data. Data protection. ET commenting. Text field. Text note. Changing the external presentation of a worksheet;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Managing operating modes in a spreadsheet";

– *independent work of the student:* processing lecture material.

TOPIC 7. Additional features of working with a spreadsheet.

– *brief summary:*

Multi-window mode. Multi-panel mode. Scaling. Checking data entered into ET. Using ET data structures and consolidation;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Managing operating modes in a spreadsheet";

– *independent work of the student:* processing lecture material.

TOPIC 8. Data management in a spreadsheet.

– *brief summary:*

The concept of a list. Planning and forming a list. Working with a form. Sorting a list. Filtering data. Autofiltering. Advanced filter. Creating a complex search criterion in a list;

– *form of classes:* lecture, practical class;

– *topic of practical class:* "Data management and working with a multi-page spreadsheet";

– *independent work of the student:* processing lecture material and individual questions (actions with lists in the form of tables, actions with lists in the form of forms).

TOPIC 9. Printing tables and charts.

– *brief summary:*

Setting up the distribution on pages: manual and automatic. Preview. Actions performed when printing an ET;

– *form of classes:* lecture;

– *topic of practical class:* none;

– *independent work of the student:* studying the lecture material.

Modular control 1

– *form of classes:* writing a modular work;

– *independent work of the student:* studying the lecture material, preparing for the modular work.

Content module 2. Tools for automating spreadsheet user actions and technology for solving economic and mathematical problems using the MAPLE package.

TOPIC 10. Building diagrams.

– *brief summary:*

Definition of business graphics. Elements of a diagram. Building a diagram. Types of diagrams. Three-dimensional diagrams. Non-standard types of diagrams. Classification of diagrams by location. Building an embedded diagram by default. Building an embedded diagram using the Diagram Wizard. Creating a diagram on a worksheet and a separate sheet (Diagram sheet). Designing

and editing diagrams (changing the size and formatting of diagram elements; editing a data series and data markers of the diagram). Printing diagrams;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Graphical presentation of spreadsheet data";

– *independent work of the student:* processing of lecture material and individual questions (creation of non-standard types of diagrams).

TOPIC 11. Tools for automating spreadsheet user actions.

– *brief summary:*

Definition of macro programming. Concept of object-oriented programming Visual Basic for Applications (VBA). Three types of macros. Tools for creating macros. Automatic tool for creating command macros. Macro execution. Assigning a macro to a hierarchical menu item, a worksheet graphic object and a toolbar button. Visual Basic panel assignment;

– *form of lessons:* lecture;

– *topic of practical lesson:* none;

– *independent work of the student:* processing of lecture material, performing individual tasks.

TOPIC 12. Fundamentals of object-oriented programming using Visual Basic of Applications. Data types.

– *brief summary:*

Visual Basic environment. Visual Basic window organization. Visual Basic of Applications (VBA) objects, properties, methods and events. Organization of links in Excel VBA. Viewing objects, properties and methods in Excel VBA. Structure of a command macro in Excel VBA. Calling macros. Creating user functions and calling them in Excel VBA. Creating user procedures and calling them in Excel VBA. Data types of the Excel VBA language. Declaring the use of variables in Excel VBA;

– *form of classes:* lecture;

– *topic of practical classes:* none;

– *independent work of the student:* performing individual tasks, studying the lecture material and individual questions (elements of the Visual Basic window, determining the date in the Excel VBA language, features of data declarations when organizing complex procedures).

TOPIC 13. Fundamentals of object-oriented programming using Visual Basic for Applications. Structures of MS Excel Visual Basic for Applications.

– *brief summary:*

Excel VBA operators. Assignment operators. Relational operators. Cycle organization operators. Operators for early termination of specified actions. Indicating a block of operators in Excel VBA. Organizing a message window and a data entry window. Designing macros on a MODULE sheet. Designing an interface using Excel VBA. Using VBA in management, financial and economic analysis;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Automation of spreadsheet data processing using macro programming";

– *independent work of the student:* performing individual tasks, studying lecture material and individual questions (creating windows with control elements on an ET worksheet, creating forms using VBA).

TOPIC 14. Automation of decision-making in economics and management using MS EXCEL.

– *brief summary:*

Expanding the capabilities of MS EXCEL for the purpose of economic analysis of industrial data. Working with lists: organizing interim summaries, using functions for list analysis, summary

tables. Working with add-in programs. Decision-making using ET: parameter selection, organizing scenarios, finding solutions;

– *form of classes:* lecture, practical lesson;

– *topic of practical lesson:* "Economic analysis and search for optimal solutions based on spreadsheets";

– *independent work of the student:* performing individual tasks, processing lecture material and individual questions (using functions for list analysis, data distribution analysis).

TOPIC 15. Technology for solving economic and mathematical problems using the MAPLE package.

– *brief abstract:*

Using the MAPLE package for mathematical modeling in economics, about the MAPLE program, the MAPLE language alphabet, operators for data processing, MAPLE system commands, graphic tools, working with tabular data;

– *form of classes:* lecture, practical lesson;

– *topic of practical training:* "Modeling of production activities of a single-profile firm";

– *independent work of the student:* completion of individual tasks, processing of lecture material and individual questions (null operators).

Module control 2

– *form of classes:* writing a module work;

– *independent work of the student:* processing of lecture material, preparation for module work.

Module 2

Individual task – calculation work "Processing tabular information in the MS EXCEL environment".

5. Individual tasks

Performance of calculation work (PP) "Processing tabular information in the MS EXCEL environment" according to options. The goals of performing calculation work are: systematization, consolidation and expansion of theoretical knowledge and practical skills of the student; gaining experience working with various sources of information, the ability to generalize and analyze economic scientific information; developing the ability to apply computer technologies to solve economic problems; conducting analysis of research results and forming meaningful conclusions.

6. Teaching methods

Verbal (explanation, story, conversation, educational discussion, etc.); visual (illustration, demonstration) and practical (practical work, individual survey, testing).

7. Control methods

Current, intermediate and final (semester) control.

Current control is carried out during practical classes in the form of theoretical surveys and solving practical problems.

Intermediate control is carried out in the form of testing according to the sections of the course.

Final (semester) control is carried out in oral and written form on the topics of the course and the defense of an individual assignment (PP).

Semester control is a test.

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			
Lecture work	0 .. 1	9	0 .. 9
Work in practical classes	0 .. 4	4	0 .. 16
Modular control	0 .. 20	1	0 .. 20
Content module 2			
Lecture work	0 .. 1	5	0 .. 5
Work in practical classes	0 .. 4	4	0 .. 16
Modular control	0 .. 14	1	0 .. 20
Implementation and protection of the RR	0 .. 16	1	0 .. 14
Total per semester			**0…100**

*During the semester, a student can earn up to 10 incentive points. Points can be obtained for the following types of work:

– work at lectures and practical classes (activity): 0 .. 5 points,

– writing and defending an abstract on the topics of the discipline: 0 .. 5 points,

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

If the maximum number of points is exceeded (more than 100), the student will receive 100 points.

Semester control (credit) is carried out in the event that the student refuses the final control points and if there is admission to the credit (the presence of a RR). When taking the semester credit, the student has the opportunity to receive a maximum of 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

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 Regulations 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 and methodological guides, lecture notes, methodological recommendations for conducting laboratory work, etc., published at the University, are available at the following link:

1. Filipkovska, L. O. Information technologies in the management of production and sales of products [Electronic resource]: teaching aids for independent work of students / L. O. Filipkovska, O. O. Volyaks. – Kharkiv: National Aerospace University named after M. E. Zhukovsky “Kharkiv. Aviation Institute”, 2021. – 73 p. URL: http://library.khai.edu/library/fulltexts/2021/complex/Filipkovska_Informatsiyni tekhnolohiyi v upravlinni.pdf

2. Filipkovska, L. O. Information technologies in the management of production and sales of products [Electronic resource]: teaching aids for independent work of students / L. O. Filipkovska, O. O. Volyaks. – Kharkiv: National Aerospace University named after M. E. Zhukovsky “Kharkiv. Aviation Institute”, 2021. – 73 p. URL: http://library.khai.edu/library/fulltexts/2021/complex/Filipkovska_Informatsiyni tekhnolohiyi v upravlinni.pdf manual for practical classes / L. O. Filipkovska, O. S. Listrova, O. O. Volyaks. – Kharkiv: National Aerospace University named after M. Ye. Zhukovsky “Kharkiv. Aviation Institute”, 2017. – 54 p. URL: http://library.khai.edu/library/fulltexts/metod.

3. Educational and methodological support of the discipline “Information technologies in production and sales management” for bachelors / National Aerospace University named after M. Ye. Zhukovsky “Kharkiv. Aviation Institute”; compiled by L. O. Filipkovska. – Kharkiv, 2019. – 247 p. – URL: http://

library.khai.edu/library/fulltexts/doc/605_Informacijn_Tehnologi_Upravlinn.pdf.

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

11. Recommended literature

Basic

1. Kotsarenko, V.O. Calculations in Excel environment: tutorial. / V.O. Kotsarenko, Yu.A. Selikhov, K.O. Gorbunov. – Kharkiv: NTU "KhPI", 2011. – 272 p.

2. Nelyubov, V. O. Fundamentals of computer science. Microsoft Excel 2016: tutorial / V. O. Nelyubov, O. S. Kurutsa. – Uzhgorod: State Higher Educational Institution "UzhNU", 2018. - 58 p.

3. Nikitenko, O.M. Maple: Solving engineering and scientific problems: Tutorial. / O.M. Nikitenko. – Kharkiv: KhNURE, 2011. – 289 p.

4. Filippovska, L. O. Information technologies in the practice of economic research [Electronic resource]: teaching aids for practical classes / L. O. Filippovska. – Kharkiv: National Aerospace University named after M. E. Zhukovsky “Kharkiv. Aviation Institute”, 2022. – 90 p. – URL: https://library.khai.edu/library/fulltexts/metod/Filippovska_Information_Technologies.pdf.

Auxiliary

1. Dybkova, L. M. Informatics and computer technology: teaching aids/ Dybkova L. M.; MES. – 3rd ed., supplement – Kyiv: Akademvydav, 2011. – 464 p.

2. Voytyushenko, N. M. Informatics and computer technology: teaching aids [for students of higher education. zakl.] / N.M. Voytyushenko, A.I. Ostapets.– [2nd ed.]. – Kyiv: Center for Educational Literature, 2009. – 564 p. URL: http://www.subject.com.ua/pdf/120.pdf.

12. Information resources

1. https://support.microsoft.com/uk-ua/office/%D0%B2%D1%96%D0%B4%D0%B5%D0%BE%D0%BA%D1%83%D1%80%D1%81%D0%B8-%D0%B7-excel-9bc05390-e94c-46af-a5b3-d7c22f6990bb