

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
 Faculty of Transport, Management and Logistics
 Logistics Department

AGREED

Dean of the Faculty of Transport,
 Management and Logistics



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«29» 11 2022

APPROVED

Vice-Rector for Academics



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«13» 12 2022



Quality Management System
COURSE TRAINING PROGRAM

on

“Logistics Systems Design”

Educational Professional Program: “Logistics”

Field of study: 07 «Management and Administration»

Specialty: 073 «Management»

Mode of study	Semester	Total (hours/ ECTS credits)	Lectures	Practicals	Self-study	HW/ CGP/ C	TP/ CPr	Form of semester control
Full-time	2	165/5,5	18	36	111	-	CPr – 2 s.	Examination – 2 s.

Index: CM-7-073-3/21-2.1.8

QMS NAU CTP 19.05-01-2022



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The Course Training Program on “Logistics Systems Design” is developed on the basis of the Educational Professional Program “Logistics”, Master Curriculum № CM-7-073-3/21 and Master Extended Curriculum № ECM-7-073-3/22 for Specialty 073 “Management” and corresponding normative documents.

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« 12 » 12 2022

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INTRODUCTION

The Course Training Program on the subject “Logistics Systems Design” is developed based on the "Methodical guidance for the subject Course Training Program", approved by the order № 249/од, of 29.04.2021 and corresponding normative documents.

1. EXPLANATORY NOTES

1.1. Place, objectives, tasks of the subject

Place of the academic subject: this subject is considered as a theoretical basis of a specialist in the field of logistics by mastering the theoretical and practical basis of a set of knowledge and skills in design of logistics systems.

The main target of the subject is to form professional competencies in the principles and technology of forming logistics systems at macro, mezo and micro levels, as well as practical skills in designing logistics systems at enterprise level.

The objectives of the subject are:

- acquisition of theoretical knowledge on the design and organization of logistics systems at macro, mezo- and micro-levels;
- application of modern design methods and forms of organization of the operation of logistic systems at macro, mezo and micro levels;
- formation of design skills and forms of organization of the operation of logistics systems at macro, mezo- and micro levels;
- use of the project approach to the formation and development of logistics systems;
- formation of skills of designing and redesigning the logistics system of the enterprise.

1.2. Learning outcomes the subject makes it possible to achieve

As a result of the study of the subject, the student must achieve the following **learning outcomes (LO)**:

- critically consider, choose and use the necessary scientific, methodical and analytical tools for management in unpredictable conditions (LO 1);
- to identify problems in the organization and justify the methods of solving them (LO 2);
- to design effective management systems for organizations (LO 3);
- to justify and manage projects, generate entrepreneurial ideas (LO 4);
- to demonstrate in-depth knowledge of the essential properties of modern logistics concepts and structural features of the formation of logistics systems, patterns of design, operation and development of logistics systems (LO 14);
- to apply specialized conceptual knowledge, which is the basis for original thinking and innovation, in particular, in the context of research of the competitiveness of logistics systems (LO 18).



1.3. Competencies the subject makes it possible to acquire

As a result of studying the discipline the student must acquire the following **competencies (integral competency – IC, general competency – GC, professional competency – PC)**:

– ability to solve complex problems and problems in the field of logistics business process management or in the learning process, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements (IC1);

– ability to conduct research at the appropriate level (GC 1);

– ability to generate new ideas (creativity) (GC 6);

– ability to abstract thinking, analysis and synthesis (GC 7);

– ability to form conclusions and recommendations based on research results, calculate the effectiveness of scientific research (GC 8);

– ability to develop projects, manage them, show initiative and entrepreneurship (PC 7);

– ability to identify ways and sources of funding, conduct economic assessment and analysis of social costs and benefits (PC 11);

– ability to design, maintain and improve logistics management systems (PC 12);

– ability to determine the capacity and evaluate the efficiency of the logistics system (PC13);

– ability to design supply chains, to coordinate the strategy of the supply chain with the business strategy of the enterprise (PC 14);

– ability to choose methods and tools of analysis and data processing in logistics (PC 15);

– ability to make innovative decisions to optimize logistics business processes (PC 18).

1.4. Interdisciplinary connections

Interdisciplinary connections: “Logistics Systems Design” is based on the knowledge of subjects: “Strategic Supply Chain Management”, “Business Analysis and Data Processing”, “HR-management”, “Logistics Management”, and complements the knowledge of such subjects as: “Financial Flows in Logistics Systems”, “Methodology of Applied Researches in Logistics”, “Risk Managements in Logistics” and others.

2. COURSE TRAINING PROGRAM ON THE SUBJECT

2.1. The subject content

Training material is structured according to the module principle and consists of two educational modules:

- **module 1 “Theoretical aspects of designing logistics systems”**,

- **module 2 “Designing a functional complex of logistics systems”**, each of



which is a logically completed, relatively independent, integral part of the subject, learning of which provides module test and analysis of its performance.

Separate **third module** (educational component) is a **Course Project (CPr)**, which is performed in the second semester. CPr is an important component of consolidation and deepening of theoretical and practical knowledge and skills acquired by the student in the process of mastering the educational material of the subject.

2.2. Modular structuring and integrated requirements for each module

Module 1 “Theoretical aspects of designing logistics systems”

Integrated requirements to the Module 1:

Know:

- basic definitions and terms of the discipline;
- principles, functions and procedure for designing and organizing logistics systems;
- methods of managing the design of the logistics system;
- methodology of the project approach to the formation and development of logistics systems of the enterprise;
- requirements for planning decisions.

Learning outcomes:

- ability to determine the structure of the logistics system in accordance with the situation on the market;
- ability to formulate economic goals and tasks of the subsystems of the logistics system;
- ability to determine the physical and market boundary of the logistics system;
- ability to clearly follow certain procedures when planning logistics systems at macro, mezo and micro levels;
- ability to assess the logistical environment;
- ability to establish an assessment of the effectiveness of the logistics system design;

Topic 1. Methodological bases of analysis and synthesis of logistics systems

Content. Structuring of the logistics system. Classification of logistics systems. Designing a complex (large) logistics system. Methodology of system analysis and modeling of the logistics system structure. Optimizing the synthesis of the organizational structure of the logistics system. Programmatic - target planning in the design of the regional transport logistics system. System logistics analysis of logistics systems design. Formalization of the logistics system at the theoretical-multiple level. The main elements and connections of the logistics system. Setting



the problem of structural and functional synthesis of the logistics system.

Topic 2. Characteristics and prerequisites of designing, forming and optimizing logistics systems.

Content. Characteristics of elements of logistics systems. The concept of the life cycle of the logistics system. Inventory of variability of the logistics system. Content, tasks and phases of the life cycle of the logistics system. Scheme of product life cycle planning. Marketing as a basis for designing, forming and optimizing logistics systems. Basic concepts of management of logistics systems.

Topic 3. Principles of designing logistics systems.

Content. Interaction and compatibility of logistics system design principles. Requirements for projected logistics systems. Information support of the logistics system. Information technologies in the design of logistics virtual enterprises. Evaluation of the logistics environment. A generalized algorithm for determining the physical and market boundaries of the logistics system. Toolkit for expanding the market boundary of the logistics system.

Topic 4. Generalized procedure for developing a logistics system.

Content. Development of procedures. Subjects and objects of the logistics system. Design parameters and meters of material flow. Principles of feedback in logistics project solutions. Criteria for the effectiveness of designing logistics systems. General principles of evaluating the efficiency of the logistics complex. Assessment of logistics system design efficiency.

Topic 5. Design of integrated logistics systems.

Content. The concept of the capacity of the logistics system of the project. Methods of optimizing and forecasting the capacity of the logistics system. Material flow forecasting. Forecasting the volume of material flow. Problem identification and project planning. Data collection and analysis. Recommendations for the implementation and implementation of the project.

Module 2 “Designing a functional complex of logistics systems”

Integrated requirements to the Module 2:

Know:

- the main stages of forming the infrastructure of the logistics system;
- regional aspects of formation of integrated logistics systems;
- principles, functions and methods of organizing the functioning of logistics systems;
- methods of optimizing the parameters of logistics systems and implementation of design solutions;
- basics of designing concentration-distribution systems of value creation;
- the process of designing logistics systems for the distribution of products and services;
- features of creating warehouses;
- types and methods of freight forwarding services.



Learning outcomes:

- ability to calculate the parameters of material and accompanying flows in logistics systems;
- ability to determine the location of logistics facilities;
- ability to apply a project approach to the formation and development of the logistics system of the enterprise;
- ability to organize the management of project participants;
- ability to plan and control the design of the logistics system and its components;
- ability to solve the problem of coordination of logistics processes during the design and organization of the logistics system;
- ability to develop routes of cargo delivery by motor transport.

Topic 1. Design of logistics systems for resource concentration.

Content. The process of designing logistics systems for concentrating resources. Analysis of the quality of the enterprise's supply of resources. Establishing the needs of the enterprise in resources. Choice of the decision "make or buy". Defining the method of procurement of resources. Determining the parameters of supply lots. The influence of the choice of resource supplier on the distribution of finished products of the enterprise. Choosing a resource provider.

Topic 2. Basics of designing concentration and distribution systems of value creation.

Content. The process of designing concentration and distribution systems. Designing value chains. Integrated value chain. Methods, models, algorithms for designing value chains. Characteristics of the supply system. Prospects for the development of logistics systems in production. Evaluation of the efficiency of integrated logistics systems.

Topic 3. Design of logistics systems for the distribution of products and services.

Content. The process of designing logistics systems for the distribution of products and services. Determining the size of areas of potential sales of products and services. Determining the number of distribution channels for products and services. Determining the locations of regional distributors. Determining the length of distribution channels for products and services. Selection of logistics intermediaries and evaluation of their activities. Control of activity of distribution channels of production and services. Logistics service system design.

Topic 4. Design of warehouses and terminals

Content. Logistics facility infrastructure. Technical and technological requirements for the construction of the warehouse. Features of creating warehouses. Design of warehouse elements. Regional location of terminal complexes and logistics centers. Choice of warehouse location. Localization of warehousing facilities. Customs clearance and insurance. Warehousing efficiency.



Topic 5. Basics of the organization of transport logistics systems.

Content. The main positions of transport logistics. Types and methods of freight forwarding services. Logistics technologies and its application in passenger transport. Modeling of passenger transport logistics system. Project and program management in passenger transport logistics systems. Choice of carrier. Development of cargo delivery routes by road. Functional-cost analysis of the process of moving goods.

Module 2. Course Project

Course Project (CPr) is performed in the 2nd semester in accordance with methodical recommendations approved in the prescribed manner.

The specific purpose of the CPr is to consolidate, systematize, generalize and deepen knowledge of professional disciplines, stimulate independence in solving specific professional problems and acquire practical skills in designing a functional complex of logistics systems.

To successfully complete the CPr, the student should **know** the procedure for designing and organizing logistics systems, methodology of project approach to the formation and development of logistics systems, methods of organizing the operation of logistics systems and optimizing the parameters of logistics systems and implementation of design solutions; **be able to** determine the structure of the logistics system according to the market situation, formulate economic goals and objectives of subsystems of the logistics system, develop a business plan for the logistics system and economically justify forms of investment in terms of updating the technical base.

Performance, execution and passing of the CPr is performed individually by each student in accordance with method guides. The time required to perform CPr is 45 hours of self-study.

2.3. Training schedule of the subject

№	Topic (thematic section)	Total, hour			
		Total	Lectures	Practicals	Self-study
1	2	3	4	5	6
2 semester					
Module 1 « Theoretical aspects of designing logistics systems »					
1.1	Methodological bases of analysis and synthesis of logistics systems	11	2	2 2	5
1.2	Characteristics and prerequisites of designing, forming and optimizing logistics systems	9	-	2	7
1.3	Principles of designing logistics systems	9	-	2	7



№	Topic (thematic section)	Total, hour			
		Total	Lectures	Practicals	Self-study
1	2	3	4	5	6
1.4	Generalized procedure for developing a logistics system	12	2	2 2	6
1.5	Design of integrated logistics systems	12	2	2 2	6
1.6	Module Test 1	12	2	2 2	6
Total by the Module 1		57	8	16	33
Module 1 «Design of Logistics Systems»					
2.1	Design of logistics systems for resource concentration	12	2	2 2	6
2.2	Basics of designing concentration and distribution systems of value creation	12	2	2 2	6
2.3	Design of logistics systems for the distribution of products and services	11	-	2 2	7
2.4	Design of warehouses and terminals	12	2	2 2	6
2.5	Basics of the organization of transport logistics systems	12	2	2 2	6
2.6	Module Test 2	4	2	-	2
Total by the Module 2		63	10	20	33
Module 3 Course Project					
Topic of the course project: “Business model of the logistics system project”		45	-	-	45
Total by the Module 3		45	-	-	45
Total by the subject		165	18	36	111

2.4. List of Examination Questions

The list of questions and content of tasks for preparation for the exam are developed by the leading teacher of the department in accordance with the course training program, approved at the meeting of the department and distributed among students.

3. BASIC CONCEPTS OF GUIDANCE ON THE SUBJECT

3.1. Teaching methods

It is recommended to use the following teaching methods during mastering the subject: lectures using multimedia presentations, work in small groups, seminar-discussion, brainstorming, solving situational tasks, cases, business game,



used to activate the educational and cognitive activity of students during the study of this subject.

3.2. List of references (basic and additional)

Basic literature

3.2.1. Global Supply Chain and Operations Management: A Decision-Oriented Introduction to the Creation of Value // Dmitry Ivanov, Alexander Tsipoulanidis, Jörn Schönberger. Springer, 2018. 578 p.

3.2.2. Omera Khan. Product Design and the Supply Chain: Competing Through Design. Kogan Page, 2018. 264 p.

3.2.3. Managing Global Supply Chains // Ron Basu, J. Nevan Wright. Taylor & Francis, 2016. 470 p.

3.2.4. Sharan Srinivas, Suchithra Rajendran, Hans Ziegler. Supply Chain Management in Manufacturing and Service Systems: Advanced Analytics for Smarter Decisions. Springer Nature, 2021. 278 p.

3.2.5. Watson Michael. Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain. 2015. 301 p.

3.2.6. Mikihisa Nakano. Supply Chain Management: Strategy and Organization. Springer, 2019. 239 p.

3.3.7. Savchenko L., Grygorak M. Determination of parameters of the stochastic inventory management system in the conditions of economically-based shortage. Eastern-European Journal of Enterprise Technologies. – 1/3(97) 2019. P.37–46. URL: <https://doi.org/10.15587/1729-4061.2019.156475>.

Additional literature

3.2.8. ОПТИМІЗАЦІЯ ЛОГІСТИЧНИХ РІШЕНЬ. Навч. посіб. / Л.В. Савченко. К.: Вид-во Нац. авіац. ун-ту «НАУ-друк», 2013. 328 с.

3.2.9. Stephen Pryke Successful Construction Supply Chain Management: Concepts and Case Studies. John Wiley & Sons, 2020. 384 p.

3.3. Internet resource

3.3.1. Supply Chain Digest. URL: <http://scdigest.com/>

3.3.2. Official site of International Warehouse Logistics Association. URL : <http://www.iwla.com>

3.3.3. Methodical guidance papers of the department (in electronic form).

4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

4.1. Assessment of certain kinds of student academic activities is carried out in accordance with table 4.1.

4.2. A student gets a credit for the completed assignment if the student's performance has been assessed positively.



Table 4.1

Kind of academic activities	Max grade	Kind of academic activities	Max grade
	Full-Time Study 2 semester		Full-Time Study 2 semester
Module 1		Module 2	
Consideration and analysis of business cases	25 (summary)	Carry out calculation tasks, consideration and analysis of situational tasks	25 (summary)
<i>For carrying out Module Test 1, a student must receive not less than</i>	<i>15</i>	<i>For carrying out Module Test 2, a student must receive not less than</i>	<i>15</i>
Carrying out Module Test 1	15	Carrying out Module Test 2	15
Total by the module 1	40	Total by the module 2	40
Total by the modules №1, №2			80
Semester examination			20
Total by the subject			100
Module 3 Course Project			
Carrying out of Course Project	60		
Defense of Course Project	40		
Carrying out and defense of Course Project	100		

4.3. The total of Grades for individual academic activities completed by a student constitutes a Current Semester Module Grade, which is entered into the Module Control Register.

4.4. The Total Semester Grade on the results of carrying out and defence of the **Course Project** is entered into a student’s record book and academic card, for example: *92/Ex/A, 87/Good/B, 79/Good/C, 68/Sat./D, 65/Sat./E etc.*

4.5. The Total Semester Grade is converted into a grade on the national scale and the ECTS scale.

4.6. The Total Semester Grade is entered in an Examination Register, a student’s record book and academic card, e.g.: *92/Ex/A, 87/Good/B, 79/Good/C, 68/Sat/D, 65/Sat./E*, etc.

4.7. The Total Grade on the subject corresponds to the Total Semester Grade. The Total Grade on the subject is entered into Diploma Supplement.



(Ф 03.02 – 01)

АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

№ прим.	Куди передано (підрозділ)	Дата видачі	П.І.Б. отримувача	Підпис отримувача	Примітки
	УССАД	14.12.22	Шмеліна Т.М.		

(Ф 03.02 – 02)

АРКУШ ОЗНАЙОМЛЕННЯ З ДОКУМЕНТОМ

№ пор.	Прізвище ім'я по-батькові	Підпис ознайомленої особи	Дата ознайомлення	Примітки

(Ф 03.02 – 04)

АРКУШ РЕЄСТРАЦІЇ РЕВІЗІЇ

№ пор.	Прізвище ім'я по-батькові	Дата ревізії	Підпис	Висновок щодо адекватності

(Ф 03.02 – 03)

АРКУШ ОБЛІКУ ЗМІН

№ зміни	№ листа (сторінки)				Підпис особи, яка внесла зміну	Дата внесення зміни	Дата введення зміни
	Зміненого	Заміненого	Нового	Анульованого			

(Ф 03.02 – 32)

УЗГОДЖЕННЯ ЗМІН

	Підпис	Ініціали, прізвище	Посада	Дата
Розробник				
Узгоджено				
Узгоджено				
Узгоджено				