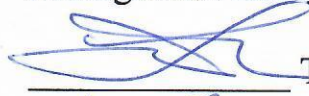


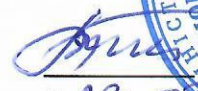

(Ф 03.02 – 110)

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


Tetyana MOSTENSKA
«21» 03 2023

APPROVED
Vice-Rector for Academics


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«23» 03 2023




Quality Management System
COURSE TRAINING PROGRAM

on

“Information System and Smart-technologies in Logistics”

Educational Professional Program: “Logistics”

Field of study: 07 «Management and Administration»

Specialty: 073 «Management»

Mode of study	Semester	Total (hours/ECTS credits)	Lectures	Laboratory classes	Self-study	HW/CGP/C	TP/C Pr	Form of semester control
Full-time	1	120/4,0	17	17	86	-	-	Graded Test 1s.

Index: CM-7-073-3/21-3.3

QMS NAU CTP 19.05-01-2023



Quality Management System
Course Training Program on
“Information System and Smart-
technologies in Logistics”

Document
Code

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The Course Training Program on “Information System and Smart-technologies in Logistics” 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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Discussed and approved by the Graduate Department for Specialty 073 “Management”, Educational Professional Program “Logistics” – Logistics Department, Minutes № 21 of 12.12.2022.

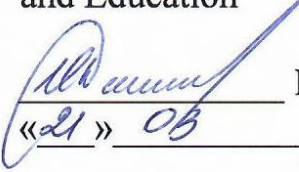
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 Iryna ZARUBINSKA
«21» 03 2023

Document level – 3b


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Master copy

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INTRODUCTION

The Course Training Program on “Information System and Smart-technologies in Logistics” 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

This academic subject is the theoretical and practical basis of the set of knowledge and skills that form the profile of a specialist in the field of logistics and supply chain management.

The purpose of the subject is the formation of a system of knowledge on the methodology and tools for the construction and use of various types of information systems and technologies, namely the use of the R-Project - a free software environment for statistical computing, the ability to use modern methods and innovative approaches in practice to justify strategic decisions in supply chain management.

The tasks of studying the academic subject are:

- ability to mathematical and logical thinking, formulation and research of mathematical models, in particular discrete mathematical models, justification of the choice of methods and approaches for solving theoretical and applied problems in the field of computer science, interpretation of the obtained results;
- the ability to detect patterns of random phenomena, application of methods of statistical data processing and evaluation of stochastic processes in logistics;
- the ability to draw logical conclusions, use formal languages and models of algorithmic calculations, design, develop and analyze algorithms, evaluate their effectiveness and complexity, solvability and insolvability of algorithmic problems for adequate modeling of subject areas and creation of software and information systems.

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**:

PLO8. Apply specialized software and information systems to solve organizational management problems.

PLO13. Be able to plan and implement information, methodological, material, financial and personnel support of the organization (unit).

PLO14. 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.



PLO16. Use information technology and information systems to monitor and optimize logistics processes and systems based on the processing of large databases.

PLO19. Be able to use methodological tools to justify strategic decisions on the management of logistics business processes and the formation of perfect supply chains.

Studying the discipline will be a useful experience for those who plan to work both in domestic and international logistics companies and consulting companies in the field of logistics.

1.3. Competencies the subject makes it possible to acquire

As a result of studying the discipline the student must acquire the following **competencies**:

EC1. Ability to solve complex tasks 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.

GC1. Ability to conduct research at the appropriate level.

GC3. Skills in the use of information and communication technologies.

GC10. Ability to make decisions in complex and unpredictable conditions that require the use of new logistics approaches.

PC7. Ability to develop and manage projects, show initiative and entrepreneurship.

PC9. Ability to analyze and structure the problems of the organization, make effective management decisions and ensure their implementation.

PC12. Ability to design, maintain and improve logistics management systems.

PC15. Ability to choose methods and tools for analyzing and processing data in logistics.

PC16. Ability to business intelligence and processing of large databases to improve supply chains (networks).

1.4. Interdisciplinary connections

This subject complements the knowledge of such subjects as " Strategic Supply Chain Management ", " Business Analysis and Data Processing " and "Logistics Management", and is also a basis for studying further subjects " Risks Management in Logistics ", "Financial Flows in Logistics Systems", " Logistics Systems Design " 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 one educational module:

- educational **module No. 1 "Software products and technologies for solving logistics problems"**, which is a logically complete, relatively independent, integral part of the curriculum, learning of which provides for modular test and analysis of its implementation.

2.2. Modular structuring and integrated requirements for each module

Module No. 1 "Software products and technologies for solving logistics problems"

Integrated requirements of module #1:

Know:

- principles of organization of information flows in the logistics system;
- the methodology of designing the logistics information system;
- functional and supporting characteristics of the logistics information system,
- modern information technologies and their application in logistics.

Learning outcomes:

- develop a project of the logistics information system;
- to form a functional subsystem of the logistics information system;
- justify the supporting subsystem of the logistics information system;
- use various software products to automate the management of logistics operations and processes,
- to make management decisions on logistics with the help of the latest information technologies.

Topic 1. Theoretical foundations of the use of information systems and technologies in logistics.

Information as an object of management in logistics systems. Value, usefulness and qualitative characteristics of logistics information. Hierarchy and composition of information solutions in logistics. Principles of formation of logistic information. Characteristics of information flows and their classification. Interrelationship of information flows with material and financial. Principles of organization of information flows in logistics systems. Life cycle of the information system.

Topic 2. Information systems, their functions and functional parameters.

Information systems of supply, production, sales, order processing, inventory management, warehousing, transportation. Types of information systems for order processing, inventory management, warehousing, transportation. Information



systems for monitoring, communication and transport dispatching. Satellite communication and navigation systems. Geographic information systems (GIS) in logistics. Electronic cards. The main tasks and technologies of the supply chain monitoring information system. Independent software products that implement separate logistics functions.

Topic 3. Information and computer technologies in the logistics processes of enterprises.

Procedure for collecting logistics information. Systematization and processing of logistic information. Basic technologies in order formation and production procedures. Basic identification technologies and their role in accelerating the movement of logistics flows. Electronic data exchange technologies. Biometric technologies. Bar coding technologies. Technologies of radio frequency identification. Basic technologies for transporting products. Monitoring of material flows in real time. Transport Management System.

Topic 4. Analysis of software products for solving logistics and supply chain management problems.

Complex information systems and accounting, management and authorization automation systems. Comparative analysis of software products used to solve logistics problems. Directions of development of information support in logistics. Approaches to the implementation of the business process automation system. SCM Solution Providers and Product Overview.

Topic 5. Information provision of business processes in the logistics system of the enterprise.

Development of the concept of information development of the enterprise and selection of IT solutions. Documentation of business processes and implementation of SCM class systems. Optimization of specialized business processes: supply chain management, product life cycle and customer interaction. Approaches to determining the effectiveness of project decisions regarding the implementation of information systems and technologies in the logistics activities of the enterprise.

Topic 6. Electronic logistics and cloud technologies.

Use of the Internet in logistics. Electronic trade. Wholesale and retail trade on the Web. Organization of electronic commerce. Technologies of electronic commerce. Electronic payments. Means of electronic communication. Supply chain management in virtual space. Concept of cloud service and technologies. Services provided by cloud systems. Categories and capabilities of cloud computing. Cloud Technologies: solutions from the user side. Review of decisions.

Topic 7. Modern concepts and smart technologies in logistics.



Smart technologies in logistics. Technologies of virtual enterprises in logistics. Intelligent systems. Internet of things. Big data (Big Data). GRID technologies. Blockchain technologies and SMART contracts. Sensor technologies. 3D printing technology. Technologies of virtual and augmented reality. Digitization of transport. Electronic freight and e-commerce systems in logistics. IT outsourcing in logistics and supply management. Management decision support systems and means of increasing the intellectual functionality of corporate information systems. Intelligent control systems and one-time indicators of the quality of goods delivery.

Topic 8. Problems of information security in logistics systems.

Threat factors. Information security systems. Analysis of threats and information risks. Protection of logistics information at the stages of collection, transmission and storage. Requirements for the protection of logistics information. Modern approaches and technologies of logistics information protection. The use of modern technologies for the protection of material resources in logistics systems and ensuring the safety of the movement of logistics flows. Computer viruses. Industrial espionage. Computer crime. Requirements for the protection of logistics information.

2.3. Training schedule of the subject

№	Theme (thematic section)	Total, hour			
		Total	Lectures	Laboratory classes	Self- study
1	2	3	4	5	6
Module No. 1 "Software products and technologies for solving logistics problems"					
1 semester					
1	Theoretical foundations of the use of information systems and technologies in supply chain management	15	2	2	11
2	Information systems, their functions and functional parameters	15	2	2	11
3	Information and computer technologies in the logistics processes of enterprises	15	2	2	11
4	Analysis of software products for solving logistics and supply chain management problems	16	2	2	12
5	Information provision of business processes in the logistics system	16	2	2	12



№	Theme (thematic section)	Total, hour			
		Total	Lectures	Laboratory classes	Self- study
1	2	3	4	5	6
6	Electronic logistics and cloud technologies	10	2	2	6
7	Modern concepts and smart technologies in logistics	10	2	2	6
8	Problems of information security in logistics systems	17	2	2 1	12
9	Module Test #1	6	1	-	5
Total by the module №1		120	17	17	86
Total by the subject		120	17	17	86

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:

- explanatory-illustrative method;
- method of problem statement;
- case method;
- reproductive method;
- research method;
- work in small groups.

The implementation of these methods are carried out during lectures, demonstrations, self-study, work with the educational material, analysis and solution of problems.

3.2. List of references (basic and additional)

Basic literature

- 3.2.1. R Core Team, R. (2020). The R project for statistical computing.
- 3.2.2. Patil, I. (2021). Visualizations with statistical details: The 'ggstatsplot' approach. Journal of Open Source Software, 6(61), 3167.
- 3.2.3. Winter, B. (2019). Statistics for linguists: An introduction using R. Routledge.
- 3.2.4. Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Partial least squares structural equation modeling (PLS-SEM) using R: A workbook (p. 197). Springer Nature.



3.2.5. Bivand, R., Millo, G., & Piras, G. (2021). A review of software for spatial econometrics in R. *Mathematics*, 9(11), 1276.

Additional literature:

3.2.6. Lawrence Leemis. *Learning Base R*. Lightning Source, 2016. ISBN 978-0-9829174-8-0.

3.2.7. Vikram Dayal. *An Introduction to R for Quantitative Economics: Graphing, Simulating and Computing*. Springer, 2015. ISBN 978-81-322-2340-5.

3.2.8. C. Sun. *Empirical Research in Economics: Growing up with R*. Pine Square, Starkville, Mississippi, USA, 1st edition, 2015. ISBN 978-0-9965854-0-8.

3.2.9. Matthias Kohl. *Einführung in die statistische Datenanalyse mit R*. bookboon.com, London, 2015. ISBN 978-87-403-1156-3.

3.3. Internet resource

3.3.1. Microsoft official homepage. URL: <https://www.microsoft.com>

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

3.3.3. R project Official website <https://www.r-project.org/>

3.3.4. Mindmeister online resource for making intelligence maps. URL: <https://www.mindmeister.com/>

3.3.5. Methodological developments of the department (in electronic form).


4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

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

Table 4.1

Kind of academic activities	Max grade
1 semester	
Module 1 « Software products and technologies for solving logistics problems »	
Carrying out practical tasks and analysis of cases	70 (summary) (5×14 g.)
<i>For carrying out module test №1, a student must receive not less than</i>	42
Carrying out Module Test №1	30
Total by the Module №1	100
Total by the subject	100

The Graded Test Grade is determined (in grades and on a national scale) based on the results of all kinds of academic activities during the semester.

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

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 final semester rating is converted into a grade on the national scale and the ECTS scale.

4.5. The Graded Test 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.

4.6. The Total Grade on the subject corresponds to the Graded Test 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
	<i>Умєро</i>	<i>28.03.23</i>	<i>Шевченко А.</i>	<i>[Signature]</i>	

(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				