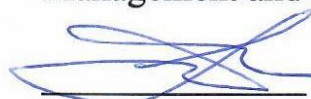


(Φ 03.02 – 110)

**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

  
  
Anatolii POLUKHIN  
«23» 03 2023



**Quality Management System**  
**COURSE TRAINING PROGRAM**

on

**“Demand planning and inventory management”**

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/C Pr	Form of semester control
Full-time	2	120 / 4,0	18	18	–	84	-	Graded Test 2s.

Index: CM-7-073-3/21-3.4

**QMS NAU CTP 19.05-01-2023**



Quality Management System  
Course Training Program on  
“Demand planning and inventory  
management”

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Code


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CTP 19.05–01–2023

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The Course Training Program on “Demand planning and inventory management” 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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2023

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Planned term between revisions – 1 year

**Master copy**

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## INTRODUCTION

The Course Training Program on «Demand planning and inventory management» 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

The place of this subject is to form the profile of a specialist in the field of logistics by mastering the theoretical and practical basis of a set of knowledge and skills in the field of demand planning and inventory management.

**The main target of the subject** is to form systematic knowledge and understanding of the conceptual foundations of demand planning and inventory management.

The objectives of the subject are:

- acquisition of theoretical knowledge of demand planning and inventory management by students;
- mastering the methodological tools of demand planning and forecasting to solve practical problems;
- acquiring skills in inventory management of the enterprise and supply chain.

#### 1.2. Learning outcomes, the subject makes it possible to achieve

The learning outcomes of this subject in conjunction with other educational components are:


- PLO1. To critically comprehend, select and use the necessary scientific, methodological and analytical tools for management in unpredictable conditions; -
- PLO15. To manage financial flows in logistics systems, optimize logistics costs and develop a budget for logistics activities;
- PLO16. Use information technology and information systems to monitor and optimize logistics processes and systems based on the processing of large databases;
- PLO 18. Use specialized conceptual knowledge that is the basis for original thinking and innovation, in particular in the context of research.
- PLO 19. Be able to use methodological tools to substantiate strategic decisions on supply chain management and the formation of perfect supply chains

#### 1.3. Competencies the subject makes it possible to acquire

As a result of studying the subject in conjunction with other educational components, a higher education seeker must acquire the following educational competencies:

- IC1. 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



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requirements;

- GC3. Skills in the use of information and communication technologies;
- GC8. Ability to formulate conclusions and recommendations based on the results of research, to calculate the effectiveness of research;
- PC4. Ability to effectively use and develop organizational resources.

#### **1.4. Interdisciplinary connections**

This subject is based on the knowledge of the subjects "Logistics Management", "Strategic Supply Chain Management" and complements the knowledge of such subjects as "Risk Management in Logistics", "Logistics Systems Design" and others and is the basis for Qualification Paper.

## **2. COURSE TRAINING PROGRAM ON THE SUBJECT**

### **2.1. The subject content**

The educational material of the discipline is structured on a modular basis and consists of one educational module, namely

- Module 1 "Demand Forecasting Methods and Inventory Management Systems", which is a logically complete, relatively independent, integral part of the curriculum, the mastery of which involves conducting a module test and analyzing the results of its implementation.

### **2.2. Modular structuring and integrated requirements for each module**

#### **Module №1: Demand forecasting methods and inventory management systems**

Integrated requirements of module #1:

Know:

- principles and methods of planning;
- planning systems and types of plans;
- the main principles of the forecasting process;
- qualitative and quantitative forecasting methods;
- theory of elasticity and utility and their role in demand forecasting;
- models of consumer behavior;
- basics of inventory management;
- methods of inventory valuation;
- inventory management systems;
- methods for calculating product inventory indicators.

Be able to:

- analyze and summarize information about: market demand; consumer behavior; the range of stocks at competitors; sales forecast;
- determine the optimal choice of the consumer;
- calculate the need for goods in terms of quantity, timing, range and nomenclature;



- to determine the optimal size of a batch of goods;
- calculate the delivery time;
- choose a methodology for calculating inventory requirements and use it to determine their size;
- analyze and select software products for demand forecasting and inventory management.

### **Topic 1: Fundamentals of demand forecasting and planning.**

Purpose and classification of forecasting procedures. The relationship between forecasting and planning. Principles and methods of planning. Planning systems and types of plans. The main principles of the forecasting process. Classification of forecasting methods.

### **Topic 2. Qualitative and quantitative forecasting methods.**

Types of qualitative forecasting methods. Features of the use of expert opinions. The method of brainstorming. The method of analogies. The method of scenarios. Possibilities of applying neural networks to demand forecasting. Types of quantitative forecasting methods. Forecasting without a trend. Forecasting with the existence of a trend. Forecasting demand for seasonal goods.

### **Topic 3. Demand forecasting: the theory of utility.**

Demand and factors of influence. Utility, the law of diminishing marginal utility of a good. Gossen's laws. Indifference curves. Budget constraints of the consumer. Optimal consumer choice.

### **Topic 4. Forecasting the demand for food products.**

Elasticity coefficient and its role in demand forecasting. Analysis of consumer behavior. Change in income and consumer response. Consumer response to changes in commodity prices. Separation of the substitution effect and the income effect. The EBC model of consumer behavior. Trindis model of consumer behavior. Analytical models for forecasting demand and consumption

### **Topic 5. Basics of inventory management.**

Types of stocks. Reasons for creating stocks and factors that contribute to increasing their level. Classification of stocks. Planning of material and production stocks. Risks of creating and maintaining inventories. Structure of costs associated with inventory management. Methods of estimating the value of inventory. Inventory management policy in production and distribution. Logistics approach to inventory management.

### **Topic 6: Analysis of basic inventory management systems in conditions of variable demand.**

Analysis of inventory management systems with stochastic demand -



replenishment systems to a constant level and maximum-minimum. Features of the systems in terms of various cost components - storage, replenishment, shortage.

Analysis of the functioning of the inventory management system with a constant frequency of replenishment to a constant level. Advantages and disadvantages of the system. Features of building a system schedule.

### **Topic 7. Features of the functioning of the maximum-minimum system in conditions of variable demand.**

Analysis of the functioning of the maximum-minimum inventory management system. Advantages and disadvantages of the system. Features of building a system schedule. Comparison of inventory management systems

### **2.3. Training schedule of the subject**

№	Theme (thematic section)	Total, hour			
		Total	Lectures	Practicals	Self- study
1	2	3	4	5	6
<b>Module No. 1 " Demand Forecasting Methods and Inventory Management Systems "</b>					
<b>2 semester</b>					
1	Fundamentals of demand forecasting and planning.	14	2	2	10
2	Qualitative and quantitative forecasting methods	14	2	2	10
3	Demand forecasting: the theory of utility	14	2	2	10
4	Forecasting the demand for food products	16	2	2	10
5	Basics of inventory management	16	2	2	12
6	Analysis of basic inventory management systems in conditions of variable demand	20	2	2	12
7	Features of the functioning of the maximum-minimum system in conditions of variable demand	19	2	2	15
8	Module Test 1	7	2	-	5
<b>Total by the module №1</b>		<b>120</b>	<b>18</b>	<b>18</b>	<b>84</b>
<b>Total by the subject</b>		<b>120</b>	<b>18</b>	<b>18</b>	<b>84</b>

## **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. Muller M. Essentials of inventory management. – HarperCollins Leadership, 2019.

3.2.2. David B, G., Trautrim, A., & Wong, C. Y. (2021). Sustainable logistics and supply chain management. Kogan page.

3.2.3. Rushton A., Croucher P., Baker P. The handbook of logistics and distribution management: Understanding the supply chain. – Kogan Page Publishers, 2022.

3.2.4. Ailawadi, S. C., & SINGH, P. R. (2021). Logistics and Supply Chain Management. PHI Learning Pvt. Ltd.

3.2.5. Khan, S. A. R., & Yu, Z. (2019). Strategic supply chain management (pp. 1-290). Switzerland: Springer.

#### **Additional literature:**

3.2.6. Becerra P., Mula J., Sanchis R. Green supply chain quantitative models for sustainable inventory management: A review //Journal of Cleaner Production. – 2021. – T. 328. – C. 129544.

3.2.7. Waters D. Supply chain management: An introduction to logistics. – Bloomsbury Publishing, 2019.

3.2.8. Abolghasemi M. et al. Demand forecasting in supply chain: The impact of demand volatility in the presence of promotion //Computers & Industrial Engineering. – 2020. – T. 142.

3.2.9. David J Piasecki. Inventory Accuracy: People, Process, & Technology (Second Edition) Paperback, 2021

#### **3.3.1. Internet resource**

3.3.1. Logistics Trend Radar. 5th Edition. Delivering Insights Today, Creating Value Tomorrow. DHL Customer Solutions & Innovation. URL: <https://bit.ly/3blr0X3>

3.3.2. 14 Supply Chain Trends for 2021/2022: New Predictions To Watch Out For. URL : <http://bit.ly/3pUxxMu>





#### 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.

Table 4.1

Kind of academic activities	Max grade
<b>2 semester</b>	
<b>Module 1 «Demand Forecasting Methods and Inventory Management Systems»</b>	
Carrying out practical tasks and analysis of cases	70 (summary) (7×10 g.)
<i>For carrying out module test №1, a student must receive not less than</i>	42
Carrying out Module Test №1	30
<b>Total by the Module №1</b>	<b>100</b>
<b>Total by the subject</b>	<b>100</b>

*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.*

4.2. A student gets a credit for the completed assignment if the student's performance has been assessed positively (Appendix 1).

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 of the Current Module Grade and Module Test Grade constitutes Graded Test Grade, which is converted into a grade on the national scale and the ECTS scale (Appendix 2).

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.



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(Ф 03.02 – 01)

### АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

№ прим.	Куди передано (підрозділ)	Дата видачі	П.І.Б. отримувача	Підпис отримувача	Примітки
	ЦМСА	28.03.23	Шевченко А.		

(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				