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

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Dean of Faculty of Transport,
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«27» 06 2021

APPROVED
Vice-Rector for Academic Affairs
_____ A. Polukhin
«25» 06 2021

Quality Management System
COURSE TRAINING PROGRAM
on
«Cargo Science»

Educational Professional programs: «Air Transportation Management»
«Multimodal Transport and Logistics»
«Onboard Support of Air.Passenger Transportation»

Field of study: 27 «Transport»
Speciality: 275 «Air Transport Technologies»
Specialization: 275.04 «Air Transport Technologies»

Training Form	Semes-ter	Total (hours/ credits ECTS)	Lectu-res	Practi-cals	Lab. clas.	Self-study	HW/ CSP	TP/CP	Semester Grade
Full-time	5	105/3,5	17	–	34	54	CSP-5s	–	examination 5s

Indexes: CB-7-275-1/21-2.1.14
CB-7-275-3/21-2.1.14
CB-7-275-4/21-2.1.14

Course Training Program on «Cargo Science» is developed on the basis of the Educational Programs on "Air Transportation Management", "Multimodal Transport and Logistics", "Onboard Support of Air Passenger Transportation", Bachelor Curriculums and Extended Curriculums №СВ-7-275-1/21, №СВ-7-275-3/21, №СВ-7-275-4/21, №ЕСВ-7-275-1/21, №ЕСВ-7-275-3/21, №ЕСВ-7-275-4/21 for Speciality 275 «Air Transport Technologies», Specialization 275.04 «Air Transport Technologies» and corresponding normative documents.

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Discussed and approved by the Graduate Department for Speciality 275 «Air Transport Technologies», Specialization 275.04 «Air Transport Technologies» and Educational Professional Program «Air Transportation Management» - Air Transportation Management Department, Minutes № 12 of «9» 06 2021

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«21» 06 2021

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Contents:

INTRODUCTION

Course Training Program on «Cargo Science» 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 subject is an integral part of the theoretical basis of knowledge and skills for mastering technological subjects in training specialists in the field of air transportation management and transports systems depending upon the characteristics of goods.

Objective to study the subject is provision of decision making by a specialist in the practice of cargo transportations concerning with determination conditions of cargo transportation, preparing cargo to transportation, using carrying capacity of vehicle.

Tasks to study the subject are giving to the future specialists knowledge from classification and transport characteristics of goods, their tare and packaging, marking, principles of goods integrity provision, principles of goods compatibility, rules of goods transportation; giving skills to determine conditions of goods transportation, prepare goods for transportation, rational usage of vehicles carrying capacity.

1.2. Learning outcomes the subject makes it possible to achieve

- Take responsibility, show public consciousness, social activity and participation in the life of civil society, think analytically, critically understand the world;
- Organize and manage the transportation of goods in various connections. Choose the type, brand, kind of vehicles and routes. Monitor the progress of transportation;
- Evaluate parameters of traffic flows. Design schemes and networks of transport systems. Develop technologies for operational management of traffic flows;
- Implement methods of organizing safe transport activities;
- Choose information systems for transportation management. Operate automated control systems and navigation systems in the transportation process. Use electronic cards;
- Critically evaluate scientific values and achievements of society in the field of transport technologies development;
- Recognize qualitative and quantitative indicators of vehicles (aircraft) operation. Evaluate the structural elements of vehicles (aircraft). Establish a connection between the structural elements of vehicles (aircraft).

1.3. Competences the subject makes it possible to acquire

- Ability to realize their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine;
- Skills to carry out safe activities;
- Ability to organize and manage loading and unloading operations and warehousing operations on transport;
- Ability to organize and manage transportation of goods (by mode of transport). Ability to apply modeling and optimization methods for effective management of complex technological and organizational as well as technical transport complexes;
- Ability to quickly control traffic flows;
- Ability to organize the interaction of transport modes;
- Ability to organize international transportation;
- Ability to use modern information technologies, automated control systems and geographic information systems in the transportation process management;
- Ability to take into account human factor in transport technologies;
- Ability to solve complex specialized problems and solve practical problems in the field of transport using theories and methods of modern transport science based on a systematic approach and taking into account the complexity and uncertainty of the transport systems operation conditions;
- Ability to generate new ideas (creativity);

- Ability to work independently and in a team;
- Knowledge and understanding of the subject area as well as understanding of professional activity;
- Ability to abstract thinking, analysis, synthesis;
- Ability to organize and manage the transportation of goods by different modes of transport;
- Ability to estimate operational, technical and economic, technological, legal, social, and environmental components of the transportation management;
- Ability to evaluate plans and proposals for transportation management and technology, drawn up by other participants, and make necessary changes based on the technical and operational parameters and principles of transport infrastructure objects, subjects and vehicles functioning;

1.4. Interdisciplinary Connections

The subject is based on following subjects, as: “Operation of transport means”, “Logistics operations on transport”, “Opeartions research on Transport” and is a basic for studying the following subjects: “Organization and technology of loading-unloading works”, “Air Cargo Transportation”, “Course Project Statistical Analysis of Transport Systems and Processes”, “Technical and Economic Research of Transport Development”, “International Transportation”, “Ergonomic provision of transport processes”.

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 modules:**

Module № 1 «Transport Characteristics of Goods», which is logically complete, relatively independent, holistic part of the subject, learning of which provides module test and analysis of its performance.

2.2. Modular structuring and integrated requirements for each module

Module №1 «Transport Characteristics of Goods»

Integrated requirements to the module №1:

Know:

- Cargo classification, cargo properties, lifting characteristics of vehicles;
- Conditions and principles of cargo integrity provision; classification and purpose of packaging;
- Cargo marking; principles of cargo comparability;

Learning outcomes:

- Determine conditions of cargo transportation depending upon their properties; select tare and packing for cargo; determine allowable overall dimensions and mass of cargo;
- Rationally use carrying capacity of vehicles; rationaly use of carrying capacity of vehicle; use IATA TACT manual on cargo transportation, reference books on cargo tare and packaging.

Topic 1. Classification of goods. Properties of goods.

Concept and subject of the course “Cargo Science”. Aim to study the subject. General notions about cargo. Cargo classification. Cargo properties.

Topic 2. Space and weight characteristics of goods

Space and weight characteristics of goods. Volume weight, chargeable weight. Requirements to goods, transported by air. Assortment of cargo, shipped by air.

Topic 3. Tare and packaging of goods

Concept of tare and packaging. Purpose of tare and packaging. Classification of packaging. Transport and special tare. System of tare dimensions. Requirements to air cargo tare and packaging. Requirements to production and usage of tare and packaging. Recycling of tare and packaging.

Topic 4. Unit Load Devices

Notions about Unit Load Devices (ULD). Advantages and disadvantages of ULDs usage. ULDs classification. ULDs characteristics. Aircraft ULDs, their types, classification and peculiarities of construction. Main principles of safe loading of goods in ULDs.

Topic 5. Formation of cargo units

Concept of cargo unit. Types of unitized loads. Factors, influencing on selection of dimensions and types of cargo units. Influence of the kind of unit load on the economic aspects of transportation.

Topic 6. Usage of carrying capacity of vehicles

Technical and economical performances of aircraft. Cargo holds location in different types of aircraft. Payload and capacity of aircraft. Transportation vehicles choosing during cargo transportation. Restrictions during cargo transportation by air. Determination of allowable overall dimensions of goods. Efficient usage of aircraft payload.

Topic 7. Goods marking

Concept and purpose of goods marking. Types of marking. Manipulation sigs. Essence of transport marking and its location. Requirements to marking. Ways of marking application. Peculiarities of goods marking on air transport. Tags and labels for goods. Modern systems of marking. Usage of bar coding technology during goods transportation. System of radio frequency identification of goods RFID.

Тема 8. Measures to improve safety of goods. Compatibility of goods during storage and transportation.

Methods of goods quality determination. Characteristics of goods losses. Natural loss of goods. Principles of goods compatibility. Determination of goods compatibility during storage and transportation.

2.3. Training schedule of the subject

№	Theme (thematic section)	Total, hour			
		Total	Lectures	Labs	Self-study
1	2	3	4	5	6
Module №1 «Transport Characteristics of Goods »					
5 semester					
1.1	Classification of goods. Properties of goods.	**11**	2	2 2	5
1.2	Space and weight characteristics of goods.	**11**	2	2 2	5
1.3	Tare and packaging of goods	**11**	2	2 2	5
1.4	Unit Load Devices	**11**	2	2 2	5
1.5	Formation of cargo units	**11**	2	2 2	5
1.6	Usage of carrying capacity of vehicles.	**11**	2	2 2	5
1.7	Goods marking.	**11**	2	2 2	5
1.8	Measures to improve safety of goods. Compatibility of goods during storage and transportation.	**12**	2 1	2 2	5
1.9	Computing and Schematic Paper	**10**	-	-	10
1.10	Module Test №1	**6**	-	2	4
Total by the module №1		**105**	**17**	**34**	**54**
Total by the subject		**105**	**17**	**34**	**54**

2.4. Computing and Schematic Paper

Computing and Schematic Paper (CSP) from the subject is carried out with the purpose to consolidate theoretical knowledge and practical skills of students and is the main stage during mastering educational materials, delivered in this semester

The aim of the CSP is mastering basic positions from unitized load formation and determination conditions of goods transportation by air.

Performance, execution and passing of the CSP is performed individually by each students in accordance with method guides.

Time necessary for CSP carrying out is 10 hours of self-studying.

2.5. Questions list for the examination

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 CONSEPTS OF GUIDANCE ON THE SUBJECT

3.1. Teaching methods

It is recommended to use the following teaching methods during mastering the subject:
- explanatory and illustrative method;
- method of problem presentation;
- reproductive method;
- research method.

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 literature

3.2.1. Gabrielova T., Lytvynenko S., Ivannikova V., Lytvynenko L., Borets I. Cargo Science and Logistics: Textbook. – K.: Publishing House “Condor”, 2020. – 268 p.

3.2.2. Gabrielova T.Yu., Gyrych V.Yu. Cargo Science: lectures course. – Kiev: NAU, 2012. – 96p.

3.2.3. Онокало В. Г. Вантажознавство: навч. посіб. для студ. Напряму підготов. 6.070101 «Транспортні технології» / В. Г. Онокало ; Нац. унт вод. госп-ва та природокористування. - Рівне : НУВГП, 2014. - 92 с.

3.2.4. ПРАВИЛА повітряних перевезень вантажів. - Наказ міністерства транспорту України №793 від 14.10.2003. із змінами, внесеними згідно з Наказом Міністерства інфраструктури № 728 від 30.11.2012

3.2.5. Інструкції з організації перевезень вантажів повітряним транспортом – Наказ міністерства транспорту України №822 від 02.11.2005.

3.2.6. Danderous Goods Regulations, поточне видання.

3.2.7. Live Animals Regulations, поточне видання.

3.2.8. Perishable Cargo Handling Manual, поточне видання

3.2.9. The Air Cargo Tariff , поточне видання

3.2.10. Airport Handling Manual, поточне видання

3.2.11. Principles of Cargo Handling, поточне видання.

Additional Literature

3.2.12. Перевезення спеціальних вантажів: підручник. Т.Ю.Габріелова, С.Л.Литвиненко, О.В.Баннов – К.: НАУ, 2015. – 456 с.

3.2.13. Організація та технологія доставки спеціальних категорій вантажів: підручник. Т.Ю. Габрієлова, С.Л.Литвиненко, О.В.Баннов. – К.: Видавничий дім «Кондор», 2018. – 416 с.

3.2.14. Вільковський Є.К. Вантажознавство (вантажі, правила перевезень, рухомий склад) : Навч. посіб. / Є.К. Вільковський, І.І. Кельман, О.О. Бакуліч - Львів: Інтелект-Захід, 2017. - 495 с.

3.3. Internet Information resource

3.3.1 www.turbinist.ru
3.3.2. http://utg.ua
3.3.3. http://ogbus.ru/
3.3.4. http://www.avid.ru/eks/diag/
3.3.5. http://jrnl.nau.edu.ua/index.php/visnik

4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

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

Table 4.1

Kind of Academic Work	Maximum Grade Values
5 semester	
Module № 1 «Transport Characteristics of Goods»	
Carrying out labs (6 points x 8)	48 (total)
Carrying out and defense of Computing and Schematic Paper	12
For admission to complete module test №1, a student must receive not less than	*36 points*
Carrying out Module Test №1	20
Total by the Module №1	**80**
Semester Examination	**20**
Total by the Subject	**100**

4.2. Completed types of educational work are credited to the student, if he received a positive rating for them.

4.3. The sum of rating assessments received by the student for certain types of completed academic work is the current modular rating assessment, which is recorded in the module control.

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

4.5. The final semester rating in points, on the national scale and the ECTS scale is entered in the test report, study card and individual curriculum of the student (record book), for example, as follows: ***92 / Excellent / A, 87 / Good / B, 79 / Good / C, 68 / Sat./D, 65 / Sat./E, etc.***

4.6. The Total Grade for the subject is equal to the average grade from Total Semester Grades with its further transformation into national scale and ECTS system.

The Total Grade is recorded to the Diploma Appendix.

(Ф 03.02 – 01)

АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

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

(Ф 03.02 – 02)

АРКУШ ОЗНАЙОМЛЕННЯ З ДОКУМЕНТОМ

№ пор.	Прізвище, ім’я, по батькові	Підпис ознайомленої особи	Дата ознайом-лення	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 введен-ня зміни
	Зміненого	Заміненого	Нового	Анульо-ваного			

(Ф 03.02 – 32)

УЗГОДЖЕННЯ ЗМІН

	Підпис	Ініціали, прізвище	Посада	Дата
Розробник				
Узгоджено				
Узгоджено				
Узгоджено				