

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

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 «25» 06 2021




Quality Management System

**COURSE TRAINING PROGRAM**

on

**«Transport Vehicles Operation»**

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	Semester	Total (hours/credits ECTS)	Lectures	Practicals	Lab. classes	Self-Study	HW/CGP	TP/CP	Semester Grade
Full-time	3	135/4,5	34	–	34	67	CGP-3s	–	Graded Test 3s

Indexes: CB-7-275-1/21-2.1.9CB-7-275-3/21-2.1.9CB-7-275-4/21-2.1.9

QMS NAU CTP 19.01–01–2021



Quality Management System  
Course Training Program  
on  
«Transport Vehicles Operation»

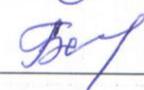
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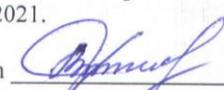
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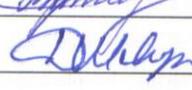
Course Training Program on «Transport Vehicles Operation» is developed on the basis of Educational Professional Program «Air Transportation Management», «Multimodal Transport and Logistics», «Onboard Support of Air Passenger transportation», Bachelor Curriculums and Bachelor Extended Curriculums №CB-7-275-1/21, №CB-7-275-2/21, №CB-7-275-3/21, №CB-7-275-4/21, №ECB-7-275-1/21, №ECB-7-275-2/21, №ECB-7-275-3/21, №ECB-7-275-4/21 for Speciality 275 «Air Transport Technologies» and corresponding normative documents.

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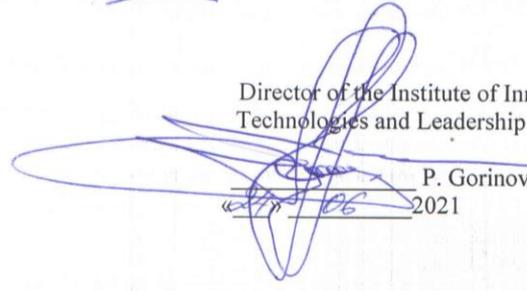
Discussed and approved by the Graduate Department for Speciality 275 «Air Transport Technologies» and Educational Professional Programs «Areal Works and Services Management», «Multimodal Transport and Logistics», «Onboard Support of Air Passenger Transportation» – Areal Works and Services Management Department, Minutes № 15 « 14 » 06 2021.

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2021

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## INTRODUCTION

Course Training Program (CTP) on «Transport Vehicles Operation» 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 in training specialists of air transportation area, studying the technological subjects.

**The objective** of the subject is to study the basic principles of operation of aviation (airport) ground support equipment (AGSE), which ensure its effective use in technological processes of air transportation services at civil aviation airports.

#### **The tasks of the subject are:**

- mastering the basics of the organization of the AGSE movement at the apron;
- study of schemes of location of specific types of AGSE in the ground service area of certain types of aircraft;
- mastering of technological schedules for ground maintenance of aircraft;
- mastering the main technological processes for commercial maintenance of aircraft;
- mastering the basics of technical operation of AGSE and aircraft;
- study of the organization of advanced systems of maintenance and repair (M/T and R) of AGSE;
- mastering the basic technological processes for maintenance of AGSE;
- study of the main types and models of modern equipment for conducting M/T and R of AGSE;
- mastering modern methods and means of diagnosing the technical condition of special vehicles (SV) at airports.

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

At the end of the course, the student will be able to:

- monitor the state of movement safety and operation of the AGSE at the apron;
- have methods of developing technological schedules for ground handling of aircraft at airports;
- develop technologies for the use of specific types of AGSE in commercial aircraft maintenance;
- develop recommendations on labor and environmental protection during the operation of SV at the airports of Ukraine;
- develop measures to ensure the reliability of AGSE;
- develop measures to improve the efficiency of use and preservation of special vehicles;
- independently study the basics of operation of modern domestic and foreign special vehicles;
- assess the technical level of different types of AGSE.

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

- Ability to quickly control the flow of traffic;
- Ability to assess operational, technical and economic, technological, legal, social, and environmental components of the organization of transportation;
- Ability to evaluate plans and proposals for the organization and technology of transportation, drawn up by other entities, and make the necessary changes based on the technical and operational parameters and principles of functioning of facilities and devices of transport infrastructure, vehicles (ships, vessels).

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#### 1.4. Interdisciplinary connections.

This subject is based on knowledge of such disciplines as "Fundamentals of the theory of transport processes and systems" and is the basis for the study of further subjects, namely: "Organization and technology of loading and unloading", "Technical and economic research of transport", "Ergonomic support transport processes".

## 2. COURSE TRAINING PROGRAM ON THE SUBJECT

### 2.1. The subject Content

Training material is structured according to module principle and consists of **two educational modules**, namely:

- educational **Module № 1 «Operation of Transport Vehicles to Provide Aviation Transportation»;**
- educational **Module № 2 «Technical Operation of Aircraft and Aviation (Airport) Ground Support Equipment»;** each of 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 «Operation of Transport Vehicles to Provide Aviation Transportation»

##### Integrated requirements to Module №1:

##### know:

- features of the organization of safe movement of AGSE on the apron and the scheme of location of SV in the service area of the aircraft;
- main technological processes for commercial maintenance of aircraft with the use of AGSE;
- technological schedules for ground maintenance of different types of aircraft;
- purpose and technical parameters of modern models of AGSE, leading manufacturers of SV of airports;
- technological processes for the preparation and use of AGSE for its intended purpose in compliance with the requirements of labor and environmental protection.

##### be able to:

- monitor the state of movement safety and operation of the AGSE at the apron;
- have methods of developing technological schedules for ground handling of aircraft at airports;
- improve technologies for the use of specific types of AGSE in the provision of air transportation;
- develop recommendations for improving the technological processes for the preparation and use of AGSE means for their intended purpose;
- develop recommendations on labor and environmental protection during the operation of SV at the airports of Ukraine.

#### **Topic 1. Operation of Transportation Means (TM) to Provide Air Transportation.**

Conditions of operation of TM at the airports of Ukraine. AGSE classifications for commercial aircraft maintenance and aircraft classification. Technological schedules of ground maintenance of aircraft (GM/T of A/C).

**Topic 2. Operation of In-Station Mechanization for Passenger Service.** Features of design and operation of passenger elevators, escalators, travolators.

**Topic 3. Organization of Aircraft Parking at the Apron.** General requirements for the organization of parking and traffic routes of A/C and AGSE at the aerodrome. Organization of SV parking T the apron. Ensuring movement safety during GM/T of A/C.

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**Topic 4. Operation of Apron Buses.** Classifications of buses. Purpose and main design features of apron buses (AB). Features of construction and operation of mobile passenger bridges. Technology of using AB.

**Topic 5. Operation of Passenger Auto- and Electric Ladders.** Classifications of passenger ladders. Technology of using passenger ladders.

**Topic 6. Operation of Passenger Landing Galleries.** General information about telescopic ladders (TL), their classifications. Features of a design and the generalized technical characteristics of TL. Technology of connection of TL with A/C at its GM/T.

**Topic 7. Operation of AGSE to Provide Postal and Freight Transportation.** Overview of mechanization and technologies for mail and cargo handling at airport cargo terminals. Ground handling technology for transport A/C. Layout of freight facilities at the airport.

**Topic 8. Operation of Self-Propelled Container Loaders.** Model range, technical characteristics of self-propelled container loaders (SPCL). 2. Technological processes for preparation for use and direct operation of SPCL in the service area of the A/C.

**Module № 2 «Technical Operation of Aircraft and Aviation (Airport) Ground Support Equipment»**

**Integrated requirements to Module №2:**

**know:**

- the main factors influencing the change in the technical condition of the AGSE during operation;
- existing and perspective systems of M/T and R of SV of airports;
- basics of technological processes for M/T and R of SV of AGSE;
- technology and means of conducting diagnostic control of airport SV;
- range of modern equipment for technical diagnostics, M/T and R special transport of civil aviation airports.

**be able to:**

- independently develop measures to ensure the reliability of AGSE;
- independently develop measures to improve the effectiveness of use and preservation of special transport;
- independently study the basics of operation of modern domestic and foreign SV;
- assess the technical level of different types of AGSE.

**Topic 1. The System of M/T and R of Special Vehicles of Airports.** Purpose, tasks, ways of the AGSE M/T and R system realization. Schematic diagram of the AGSE M/T and R planning and preventive system. The main elements of the M/T and R system of SV.

**Topic 2. Strategies of M/T of AGSE.** Analysis of changes in the technical condition and reliability of AGSE. Modern systems of AGSE M/T and R. The list of works at various types of airport SV M/T.

**Topic 3. Special Vehicles M/T According to the Actual Technical Condition (TC).** The list of the main factors influencing the change of SV TC. Classification of failures of units of SV, prevention of failures. Features of the M/T system according to the actual TC. The main directions of improvement of the AGSE M/T and R system.

**Topic 4. Pre-Operational Preparation of AGSE.** Typical defects in the production of AGSE. General information, technology of pre-operational preparation. Scheme of preparation of new SV of airports.

**Topic 5. Rules of Operation of AGSE.** Running-in of SV before operation. Transportation of SV. Storage and conservation of AGSE.

**Topic 6. External Supervision of Airport SV.** List of cleaning and washing works. Classification of washing equipment. Portal and tunnel washing systems. Main and auxiliary components of washing systems.



**Topic 7. Prevention of Corrosion of Bodies and Wings of SV.** The concept of corrosion, stages of corrosion of SV body elements. Classification of corrosion processes. Technology to resist corrosion of SV bodies. Types of means for anti-corrosion treatment of SV bodies and wings.

**Topic 8. M/T of Internal Combustion Engines (ICE).** Troubleshooting in modern ICE. Diagnosis of ICE. Faults of ICE systems and mechanisms. M/T of ICE.

**Topic 9. Technical Diagnostics of Airport Special Vehicles.** Tasks and place of technical diagnostics of AGSE in the technological process of M/T and R. Systems for diagnosing the technical condition of SV. The place of technical diagnostics (TD) in the technological process of M/T and R. Methods and technology for diagnosing AGSE.

### 2.3. Training schedule of the subject.

№	Theme (thematic section)	Total, hours			
		Total	Lectures	Lab. classes	Self-Study
1	2	3	4	5	6
<b>Module № 1 «Operation of Transport Vehicles to Provide Aviation Transportation»</b>					
1.1	Operation of Transportation Means (TM) to Provide Air Transportation	<b>3 semester</b>			
		7	2	2	3
1.2	Operation of In-Station Mechanization for Passenger Service	7	2	2	3
1.3	Organization of Aircraft Parking at the Apron	7	2	2	3
1.4	Operation of Apron Buses	7	2	2	3
1.5	Operation of Passenger Auto- and Electric Ladders	7	2	2	3
1.6	Operation of Passenger Landing Galleries	7	2	2	3
1.7	Operation of AGSE to Provide Postal and Freight Transportation	8	2	2	4
1.8	Operation of Self-Propelled Container Loaders	6	2	-	4
1.9	Module Test №1	6	-	2	4
<b>Total by the module №1</b>		<b>62</b>	<b>16</b>	<b>16</b>	<b>30</b>
<b>Module № 2 «Technical Operation of Aircraft and Aviation (Airport) Ground Support Equipment»</b>					
2.1	The System of M/T and R of Special Vehicles of Airports	7	2	2	3
2.2	Strategies of M/T of AGSE	7	2	2	3
2.3	Special Vehicles M/T According to the Actual Technical Condition (TC)	7	2	2	3
2.4	Pre-Operational Preparation of AGSE	7	2	2	3
2.5	Rules of Operation of AGSE	7	2	2	3
2.6	External Supervision of Airport SV	7	2	2	3
2.7	Prevention of Corrosion of Bodies and Wings of SV	7	2	2	3
2.8	M/T of Internal Combustion Engines (ICE)	6	2	2	2
2.9	Technical Diagnostics of Airport Special Vehicles	4	2	-	2
2.10	Calculation and Graphic Paper	10	-	-	10
2.11	Module Test №2	4	-	2	2
<b>Total by the module №2</b>		<b>73</b>	<b>18</b>	<b>18</b>	<b>37</b>
<b>Total by the subject</b>		<b>135</b>	<b>34</b>	<b>34</b>	<b>67</b>



## 2.4. Calculation and Graphic Paper

Calculation and graphic paper (CGP) on the subject is performed in order to consolidate and deepen the theoretical and practical knowledge and skills that form the profile of a specialist in the field of air transportation management.

**The purpose** of CGP – analysis of the existing maintenance systems of the airport SV, development of technology for maintenance and lubrication of AGSE, justification of the feasibility of implementing a specific maintenance system, based on the assessment of the design and operational features of the AGSE selected model, analysis of modern garage equipment, design projecting of the stations for the airport SV M/T and R carrying out.

To successfully complete the CGP, the student must:

**know:**

- modern AGSE M/T systems;
- main types of AGSE for commercial M/T of A/C, their purpose and technical parameters;
- main types of garage and diagnostic equipment for the AGSE M/T and R carrying out.

**be able to:**

- choose and justify the system of M/T and R for a specifically selected type and model of AGSE;
- develop a scheme of the M/T or diagnostic test station for a specifically selected type and model of AGSE;
- select and optimally place on the designed site for M/T or TD the necessary list of modern equipment for M/T or diagnostic check of AGSE, depending on the selected system of M/T and R;
- develop a system of measures for labor and environmental protection during the operation of a certain type of garage or diagnostic equipment.

Execution, registration, and defense of CGP is carried out by the student individually according to methodical recommendations.

The time required to perform the CGP is 10 hours of independent work.

## 3. BASIC CONCEPTS OF GUIDANCE ON THE SUBJECT

### 3.1. Teaching Methods

The following teaching methods of subject guidance are:

- 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 literature, analysis and problem solving.

### 3.2. List of References (Basic and Additional)

#### Basic Literature

3.2.1. Тамаргазін О.А., Білякович О.М., Варюхно В.В., Нікулін С.М. Технічна експлуатація авіаційної наземної техніки: Підручник / О.А.Тамаргазін, О.М.Білякович, В.В.Варюхно, С.М.Нікулін. – К.: ДП «Розвиток» МВС України, 2017. – 320 с.

3.2.2. Дмитриченко М.Ф., Білякович О.М., Міланенко О.А., Савчук А.М., Туриця Ю.О. Триботехнічні характеристики мастильних матеріалів в умовах експлуатації машин і механізмів: монографія / М.Ф.Дмитриченко, О.М.Білякович, О.А. Міланенко, А.М.Савчук, Ю.О.Туриця. – К.: НТУ, 2016. – 124 с.

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3.2.3. Дмитриченко М.Ф., Міланенко О.А., Білякович О.М., Савчук А.М., Туриця Ю.О. Підвищення надійності транспортних засобів шляхом застосування модифікаторів тертя: монографія / М.Ф.Дмитриченко, О.А. Міланенко, О.М.Білякович, А.М.Савчук, Ю.О.Туриця. – К.: НТУ, 2017. – 104 с.

### Additional Literature

3.2.4. Технологии наземного обслуживания воздушных судов: Лабораторный практикум для студентов-иностранцев / сост. О.Н.Білякович, А.В.Данилейко, Л.Г.Білякович – К.: НАУ-друк., 2017. – 68 с.

3.2.5. ДСТУ 2860-94 Надійність техніки. Терміни та визначення.

3.2.6. ДСТУ 3432-96 Авіаційна наземна техніка. Терміни та визначення.

3.2.7. ДСТУ 2389-94 Технічне діагностування та контроль технічного стану. Терміни та визначення.

### 3.3. Internet Resource

3.3.1. Repair and Maintenance Information - RMI [Електронний ресурс]. – Режим доступу: <https://www.acea.be/industry-topics/tag/category/repair-and-maintenance-information-rmi>

3.3.2. Maintenance Tech., Inc., (MTI) – 1 [Електронний ресурс]. – Режим доступу: <https://www.carwashtec.com/contact-car-wash-equipment-suppliers>

3.3.3. Periodic Technical Inspection (APK) [Електронний ресурс]. – Режим доступу: <https://www.rdw.nl/over-rdw/information-in-english/private/periodic-technical-inspection-apk>

## 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.

Таблиця 4.1

Kind of Academic Work	Max Grade Values	Kind of Academic Work	Max Grade Values
<b>3 semester</b>			
<b>Module № 1 «Operation of Transport Vehicles to Provide Aviation Transportation»</b>		<b>Module № 2 «Technical Operation of Aircraft and Aviation (Airport) Ground Support Equipment»</b>	
Kind of Academic Work	Grade	Kind of Academic Work	Grade
Carrying out laboratory works (4p x 7)	28 (total)	Carrying out laboratory works (3p x 8)	24 (total)
		Carrying out calculation and graphic paper	20
<i>For admission to complete module test №1, a student must receive not less than</i>	<i>17 points</i>	<i>For admission to complete module test №2, a student must receive not less than</i>	<i>27 points</i>
Module test №1	12	Module test №2	16
<b>Total by the module №1</b>	<b>40</b>	<b>Total by the module №2</b>	<b>60</b>
<b>Total by the modules №1 and №2</b>			<b>100</b>
<b>Total by the subject</b>			<b>100</b>

**The credit rating** is determined (in points and in a National Scale) based on the results of all types of academic work accomplishing during the semester.

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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 the rating assessments received by the student for certain types of completed academic work is the current modular rating assessment, which is recorded to the module check.

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 into 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 Rating Grade for the subject is equal to the Total Semester Rating Grade. The Total Rating Grade is recorded to the Diploma Appendix.

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(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 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				