Ministry of Education and Science of Ukraine
National Aerospace University. ME Zhukovsky
Kharkiv Aviation Institute

Department of Aircraft and Helicopter Design (№ 103)

APPROVE

Project team leader _____

(signature) (initials and surname)

«_____»_____2021

CURRICULUM WORK PROGRAM

Aviation ground equipment
(code and name of the discipline)

Branch of knowledge: 27 "Transport"
(code and name of the industry)
Specialty: 272 "Air transport"
(code and name of the specialty)
Educational program: Aircraft maintenance and repair and aircraft engines
(name of educational program)

Form of study: full-time

Level of higher education: first (bachelor's)

Kharkiv 2021

Work program "Aviation ground equipment" _____

(name of academic discipline)

for students majoring in 272 "Air Transport"

educational program Aircraft maintenance and repair and aircraft engines

20 June 2021, 11 with.

Developer: Ph.D., Associate Professor, Associate Professor 103 Momot MM

The work program was considered at the meeting of the department

Design of airplanes and helicopters

Protocol № 1 from " 27 " August 2021 p.

Head of the Department of Aircraft and Helicopter Design №103

Ph.D.,

(signature) (surname and initials)

<table>
<tr><td rowspan="2">Name
indicators</td><td rowspan="2">Field of knowledge, direction of training, educational

qualification level</td><td>Characteristic academic discipline</td></tr>
<tr><td>Full-time education</td></tr>
<tr><td>Number of credits - 3.0</td><td rowspan="3">Branch of knowledge

27 "Transport" (code and name)</td><td>Selective</td></tr>
<tr><td>Modules - 0</td><td rowspan="2">Academic year:</td></tr>
<tr><td>Content modules - 4</td></tr>
<tr><td rowspan="4">Individual task:
The main technical characteristics of aviation ground equipment
(name)</td><td rowspan="4">272 "Aviation Trans-port "(code and name)</td><td>2020-2021</td></tr>
<tr><td>Semester</td></tr>
<tr><td>3rd</td></tr>
<tr><td rowspan="2">the total number of hours - 64 / 120</td><td rowspan="12">Level of higher education:
first (bachelor's)</td><td rowspan="2">Lectures</td></tr>
<tr><td rowspan="11">Number of weekly hours for time study
Semester 4:
classroom - 2
independent work of the</td></tr>
<tr><td>24 hours</td></tr>
<tr><td>Practical</td></tr>
<tr><td>-</td></tr>
<tr><td>Laboratory</td></tr>
<tr><td>24 - hours</td></tr>
<tr><td>Individual work</td></tr>
<tr><td>42 hours</td></tr>
<tr><td>Individual work</td></tr>
<tr><td>1</td></tr>
<tr><td>type of control</td></tr>
<tr><td>Test</td></tr>
</table>

Note

The ratio of the number of hours of classroom classes to independent and individual work is: for full-time study - 48/90

2. The purpose and objectives of the discipline

Purpose of studying - mastering the basic theoretical principles of the principles of construction and functional zoning of aviation ground equipment, which ensure the effective use of aviation ground equipment during ground maintenance of aircraft, flight support, labor protection and the environment.

Task - mastering the scientific base in the field of principles of construction and operation aviation ground equipment; consolidation of previously acquired knowledge in disciplines: introduction to the profession; mechanics of materials and structures; providing knowledge for the study of disciplines: technology of ground maintenance of aircraft, technical operation of aircraft; intensification of education and preparation of students for the choice of field and specialty of practical activity in the new market conditions.

As a result of studying the discipline the student must ***know:***

- purpose and main tasks of aviation ground equipment;
- technical characteristics of aviation ground equipment;
- features of construction of aviation ground equipment and its main units;
- principles of operation of special equipment of aviation ground equipment;
- features of operation of aviation ground equipment and its special equipment;
- system of certification of aviation ground equipment;
- safety requirements for the operation of aviation ground equipment;

be able:

- make calculations and analysis of operational indicators of aviation ground equipment;
- assess the completeness and technical condition of aviation ground equipment and its special equipment;
- analyze the processes that occur during the operation of special equipment
- independently master the design of new models of aviation ground equipment;
- follow safety rules during the operation of aviation ground equipment;

have an idea:

- on the history and development trends of aviation ground equipment;
- on the system of certification of aviation ground equipment.

Interdisciplinary links:

The course is based on the knowledge gained during the study of the introduction to the profession, mechanics of materials and structures.

The knowledge and skills acquired during the study of this discipline will be used in the study of the vast majority of the following disciplines of

professional and practical training of masters, namely: Maintenance of airworthiness of aircraft, Fundamentals of maintenance of aircraft and aircraft engines, The human factor in the operation of aviation equipment, flight safety and aviation safety.

3. The program of the discipline

Content module 1. Operational properties and reliability of aviation ground equipment

Topic 1. **Introduction to the discipline "Aviation ground equipment"**

The subject of the discipline, scientific and methodological foundations, the relationship with other disciplines, the order of study and reporting, recommendations for independent acquisition and deepening of knowledge. The main historical stages of development of aviation ground equipment. Purpose and main tasks of aviation ground equipment. Certification system for aviation ground equipment. Safety requirements for the operation of special machines.

Topic 2. **Operational properties and reliability of aviation ground equipment** Operating conditions of aviation ground equipment. Road conditions of airports.

Climatic conditions of airports. Operating modes of aviation ground equipment. Use of aviation ground equipment over time. Theoretical bases of reliability of aviation ground equipment. Operational indicators of aviation ground equipment.

Content module 2. Means of technical support of flights

Topic 3. **Means of power supply and aircraft launch** Purpose of means of power supply of the aircraft. Technical characteristics of electric units. Design of aircraft power supplies and their main units. Principles of operation of special equipment for aircraft power supply. Features of operation of aircraft power supply.

Purpose of means of air start of aircraft engines. Technical characteristics of aircraft engine start-up means. Design of air starters for aircraft engines and their main units. Principles of work special equipment for air starters of aircraft engines. Features of operation of air starters of aircraft engines.

Topic 4. **Installation for maintenance of aircraft hydraulic systems** Purpose of the installation for maintenance of aircraft hydraulic systems. Technical characteristics of the installation for maintenance of hydraulic systems of the aircraft. Design of the installation for maintenance of hydraulic systems of the aircraft. Principles of operation of special equipment of the installation for servicing the hydraulic systems of the aircraft. Features of operation of the installation for maintenance of hydraulic systems of the aircraft.

Topic 5. **Heat engineering machines**

Purpose of heat engineering machines for aircraft maintenance. Construction of heat engineering machines for aircraft maintenance. Principles of operation of special equipment of heat engineering machines for aircraft maintenance. Features of operation of heat engineering machines for aircraft maintenance.

Topic 6. **Self-propelled mechanical means for aircraft maintenance** Purpose of self-propelled mechanical means for aircraft maintenance. Technical characteristics of self-propelled mechanical means for aircraft maintenance. Design of self-propelled mechanical means for service. Principles of operation of special equipment of self-propelled mechanical means for aircraft maintenance. Features of operation of self-propelled mechanical means for aircraft maintenance.

Topic 7. **Means of towing the aircraft** Appointment of means of towing the aircraft. Technical characteristics of aircraft towing facilities. The design of the means of towing the aircraft. Principles of operation of special equipment for towing aircraft. Features of operation of aircraft towing means.

Content module 3 Aircraft refueling facilities

Topic 8. **Fuel means of aircraft fuel.**

Purpose of fueling the aircraft. Technical characteristics of fuel refueling equipment. Design of fuel and lubricants for refueling aircraft and their main units.

Principles of operation of special equipment for refueling aircraft fuel. Features of operation of fueling means of aircraft fuel.

Topic 9. **Means of refueling the aircraft with gases** Appointment of means of refueling the aircraft with gases. Technical characteristics of aircraft refueling means. Design of aircraft refueling means and their main units. Principles of operation of special equipment for refueling aircraft. Features of operation of aircraft refueling means.

Topic 10. **Cleaning, washing and anti-icing agents** Appointment of cleaning, washing and anti-icing liquids. Technical characteristics of cleaning, washing and anti-icing liquids. Construction of means for cleaning, washing and application of anti-icing fluids and their main units. Principles of operation of special equipment for cleaning, washing and application anti-icing fluids. Features of operation of means of cleaning, washing and drawing of liquids against freezing.

Content module 4 Ground means for air transportation and airfields

Topic 11. **Means of transporting passengers** Purpose of means of transportation of passengers and cargoes. Technical characteristics of means of transporting passengers and goods. Construction of means of transportation of passengers and cargoes. Principles of operation of special equipment for passenger and cargo transportation. Features of operation of means of transportation of passengers and cargoes.

Topic 12. **Means for maintenance of airfields** Assignment of funds for summer and winter maintenance of airfields. Technical characteristics of means for summer and winter maintenance of aerodromes. Design of means for summer and winter maintenance of aerodromes and their main units. Principles of operation of special equipment for summer and winter maintenance of airfields. Features of operation of means for summer and winter maintenance of aerodromes.

4. The structure of the discipline

Names of content modules and topics	Total	Lecture hours	Lab hours	Hours of Ind. work
1	2	3	4	5
Content module 1. Operational properties and reliability of aviation ground equipment				
Topic 1. Introduction to the discipline "Aviation	5	2		3
Topic 2. Operational properties and reliability of aviation ground equipment	11	2	4	5
Together on the content module 1	**16**	**4**	**4**	**8**
Content module 2. Means of technical support of flights				
Topic 3. Means of power supply and aircraft launch	7	2	2	3
Topic 4. Installation for maintenance of aircraft hydraulic systems	7	2	2	3
Topic 5. Heat engineering machines	7	2	2	3
Topic 6. Self-propelled mechanical means for aircraft maintenance	7	2	2	3
Topic 7. Means of towing the aircraft	7	2	2	3
Together on the content module 2	**35**	**10**	**10**	**15**
Content module 3 Aircraft refueling facilities				
Topic 8. Means of refueling the aircraft with fuel and lubricants	7	2	2	3
Topic 9. Means of refueling the aircraft with gases	7	2	2	3
Topic 10. Means for cleaning, washing and applying anti-icing liquids	7	2	2	3
Together on the content module 3	**21**	**6**	**6**	**9**
Content module 4 Ground means for air transpiration and airfields				
Topic 11. Means of transportation of passengers and cargo	9	2	2	5
Topic 12. Means for summer and winter maintenances of airfields	9	2	2	5
Together for the content module 4	**18**	**4**	**4**	**10**
Together for the 3rd semester	**90**	**24**	**24**	**42**
Together with the discipline	**90**	**24**	**24**	**42**

5. Seminar Classes Themes

Absent

6. Topics of practical classes

Absent

7. Laboratory Classes Themes

Nos	Theme	Hours
1	Evaluation of operational and technical indicators	4
2	Features of the design of power supply	2
3	Features of a design of installation for and aircraft launch service of hydraulic systems of the aircraft	2
4	Features of a design of heat engineering cars	2
5	Features of design of self-propelled mechanical means for aircraft maintenance	2
6	Features of a design of means of towing of the aircraft	2
7	Features of a design of means of refueling of the aircraft with fuel	2
8	Features of a design of means of refueling of the aircraft by gases	2
9	Features of a design of means for cleaning, washing and drawing liquids against icing	2
10	Features of a design of means of transportation of passengers and cargo	2
11	Features of a design of means for summer and winter maintenance airfields	2
	Total	**24**

8. Independent work

NOS	Theme	hours
1	Certification system for aviation ground equipment	2
2	Safety requirements for the operation of special machines	1
3	Performance indicators of aviation ground equipment	5
4	The main technical characteristics of the means of power supply and launch of the aircraft	2
5	The main technical characteristics of installation of air start of the aircraft	1
6	The main technical characteristics of installation for service of hydraulic systems of the aircraft	3
7	The main technical characteristics of heat engineering machines	3

8	The main technical characteristics of self-propelled mechanical means for aircraft maintenance	3
9	The main technical characteristics of the means of towing the aircraft	3
10	The main technical characteristics of the means of refueling the aircraft (kerosene, oil)	3
12	The main technical characteristics of the means of refueling the aircraft gas (oxygen, nitrogen)	3
13	The main technical characteristics of means for cleaning, washing and applying antifreeze	3
14	The main technical characteristics of means of transportation of passengers	3
15	The main technical characteristics of means of means of transportation of freights	2
16	The main technical characteristics of means of means for the summer maintenance of airfields	2
17	The main technical characteristics of means for winter maintenance of airfields	3
	Total	42

9. Individual tasks

1. The main technical characteristics of aviation ground equipment.

10 Teaching methods

Conducting classroom lectures, laboratory classes, individual consultations (at needs), independent work of students on the materials published by the department (methodical manuals) and leading aviation organizations, use of materials of the Internet and electronic materials posted on the website of the department, conducting the first round of the Olympiad in the specialty.

11.Methods of control

Carrying out of current control, written modular control, final control in the form of offset.

12.Distribution of points received by students

12.1. Distribution of points received by students (quantitative evaluation criteria)

Semester 3 (credit)

Current testing and independent work													Final test (exam) in case of refusal of points of the current test - and admission to the examination
Contents howl module №1		Meaningful Mean module №2 modi					ingful Meaning le №3 module			ful Amount №4			
T1	T2’	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	100	100
6	8	9	9	9	9	9	9	9	9	7	7		

T1, T2,..., T12 - topics of content modules

Semester control (credit) is carried out in case of refusal of the student from points of current testing and in the presence of the admission to credit. During the semester test the student has the opportunity to receive a maximum of 100 points.

The ticket for the test consists of 2 questions. Each ticket contains 2 theoretical questions. The maximum number of points for each theoretical question is 50.

12.2 Qualitative evaluation criteria

The required amount of knowledge to obtain a positive assessment:

Satisfactory (60-74). Show the set minimum of knowledge. Protect all individuals tasks and pass testing.

Good (75-89). Firmly know the minimum, protect all individual tasks, perform all KR.

Excellent (90-100). Pass all checkpoints with a grade of "excellent". Thoroughly know all the topics.

The required amount of skills to obtain a positive assessment:

Satisfactory (60-74). Show the set minimum of knowledge and skills. Protect everyone individual tasks and pass testing.

Good (75-89). Firmly know the minimum, protect all individual tasks, perform all KR.

Excellent (90-100). Pass all checkpoints with a grade of "excellent". Thoroughly know all the topics and be able to apply them.

12.3 Criteria for evaluating student work during the semester

Satisfactory (60-74). Have a minimum of knowledge and skills. Work out and protect all labs rotary work and homework.

Good (75 - 89). Firmly know the minimum knowledge, perform all tasks. Show skills perform and defend all laboratory work within the period specified by the teacher with a justification of the decisions and measures proposed in the works.

Excellent (90 - 100). Fully know the basic and additional material. Know all topics. Navigate in textbooks and manuals. Unmistakably perform and defend all laboratory work within the period specified by the teacher

with a detailed justification of the decisions and measures proposed in the works.

Rating scale: pointed and traditional

Total rating	Exam, test with a grade	Test
90 – 100	Excellent	Passed
75 – 89	Good	
60 – 74	Satisfactory	
01 – 59	Unsatisfactory	Not passed

13. Methodical support

Lecture notes and literature located in the library, methodical office and in electronic form on the server of the Department of Aircraft and Helicopter Design (the list is given below in section 14 of this program).

14. Recommended reading

Basic

1.Aviation ground equipment / V.E. Kanarchuk, GN Гелетуха, B.B. Zaporozhets and etc .; under. ed. V.E. Kanarchuk. - M .: Транспорт, 1989. - 278 c.

2.Aerodrome-technical support of flights: lecture notes / O.M. Bilyakovich. - К.: Вид-во Нац. aviation. University "NAU-print", 2009. - 84 p.

3.Units of ground maintenance of aircraft and helicopters / VA Egorichev, EI Osokin, ED Khachikyan - M .: Transport, 1973. - 200 p.

4.DSTU EN 1915-2: 2013. Aviation ground equipment The official edition. Kiev MINISTRY OF ECONOMIC DEVELOPMENT OF UKRAINE 2014

5. DNAOP 5.1.30-1.06-98 (NPAOP 63.23-1.06-98). Rules of labor safety at maintenance and repair of aircraft. Ed. Kiev, 1998

6.Aircraft Ground Support Equipment and Airport Technical Equipment Operation: Guide to Practical Classes / OM Bilyakovych, MS Storozhenko, Ye. P. Puhachevska, AG Dovgal. - K.: NAU, 2014. - 76 .p

Auxiliary

7. EN 1915-1: 2001 Aviation ground equipment. General requirements. Part 1. Basic
safety requirements

8.EN 12312-1 Aviation ground equipment. Special requirements. Part 1. Traps passfat

9.EN 12312-2 Aviation ground equipment. Special requirements. Part 2. Transport for the supply of ready meals

10. EN 12312-3 Aviation ground equipment. Special requirements. Part 3. Transport means with the belt conveyor

11. EN 12312-4 Aviation ground equipment. Special

requirements. Part 4 Passenger
landing galleries

12. EN 12312-5 Aviation ground equipment. Special requirements. Part 5. Equipmentrefueling
13. EN 12312-6 Aviation ground equipment. Special requirements. Part 6. Means for removal and equipment to prevent ice formation
14. EN 12312-7 Aviation ground equipment. Special requirements. Part 7: Equipment- for ground traffic of aircraft
15. EN 12312-8 Aviation ground equipment Special requirements. Part 8. Traps and maintenance platforms
16. EN 12312-9 Aviation ground equipment. Special requirements. Part 9 Loadcontainers / pallets
17. EN 12312-10 Aviation ground equipment. Special requirements. Part 10. Aircraft tractors rhodrome containers and pallets
18. EN 12312-11 Aviation ground equipment. Special requirements. Part 11. Container trucks and trailers
19. EN 12312-12 Aviation ground equipment. Special requirements. Part 12. Means
provision of drinking water
20. EN 12312-13 Aviation ground equipment. Special requirements. Part 13. Means sewage
21. EN 12312-14 Aviation ground equipment. Special requirements. Part 14. Transport for boarding the disabled and people with disabilities
22. EN 12312-15 Aviation ground equipment. Special requirements. Part 15. Tractor units garage and equipment
23. EN 12312-16 Aviation ground equipment. Special requirements. Part 16. Equipment- to start compressed air aircraft engines
24. EN 12312-17 Aviation ground equipment. Special requirements. Part 17. Equipmentair conditioning systems
25. EN 12312-18 Aviation ground equipment. Special requirements. Part 18. Nitrogen and oxygen units
26. EN 12312-19 Aviation ground equipment. Special requirements. Part 19. Aviation lifts, axial jacks and hydraulic tail supports
27. EN 12312-20 Aviation ground equipment. Special requirements. Part 20. Electrical aerodrome units
28.

15. Information resources

1. Website of the Department of Aircraft and Helicopter Design: **k103@d4.khai.edu**.
2. Server of the Department of Aircraft and Helicopter Design.
3. Internet resources
4. Site "Aerodrome equipment"