MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

National Aerospace University
Kharkiv Aviation Institute

APPROVED
Academic Council
National Aerospace
University
Kharkiv Aviation Institute
Chairman of the Academic Council
_____
_____, "__", 2020, minutes No. ___

EDUCATIONAL PROGRAM

Design, manufacture and certification of aeronautical engineering

Level of higher education - first (bachelor's degree) in the major 134 Aerospace Engineering

Field of study 13 Mechanical Engineering

Qualification: Bachelor of Aviation and Rocket and Space Engineering

Educational program comes into effect
dated _____ ,"__" 2020

Rector of National Aerospace University Kharkiv Aviation Institute
_____ M.V. Nechyporuk
order No. ___ dated _____ "__" ,2020

Kharkiv 2020

PREFACE

Educational program "Design, manufacture and certification of aeronautical engineering" in the major 134 "Aerospace Engineering" for training bachelors was developed by the working group of the National Aerospace University "Kharkiv Aviation Institute" which consists of the following individuals:

Chairman of the working group:	Plankovsky S.I.	Doctor of Engineering, Professor, Dean of the Faculty of Aircraft Engineering
Working group members:		
	Eremenko S.M.	Candidate of Engineering, Docent, Head of Department of Aerohydrodynamics
	Breha D.A.	Candidate of Engineering, Docent, Associate Professor of Department of Aerohydrodynamics
	Fomichov P.O.	Doctor of Engineering, Professor, Head of Department of Aircraft Strength
	Zarutsky A.V.	Candidate of Engineering, Senior Lecturer of Department of Aircraft Strength
	Humenny A.M.	Candidate of Engineering, docent, Associate Professor of Department of Aircraft and Helicopter Design
	Chumak A.S.	Senior lecturer of Department of Aircraft and Helicopter Design
	Bychkov I.V.	Doctor of Engineering, Senior Researcher, Head of Department of Aircraft Production Technology
	Pavlenko O.A.	Candidate of Engineering, Senior Lecturer of Department of Aircraft Production Technology

agreed with stakeholders:

INTRODUCTION

According to Art. 1 "Basic terms and definitions" of Section I "General Provisions" of the Law of Ukraine "On Higher Education" of 01.07.2014 No. 1556-VII (as amended) educational program is a single set of educational components (disciplines, individual tasks, practices, control measures, etc.) aimed at achieving the learning outcomes provided by the program, which gives the right to obtain certain academic or academic and professional qualifications.

The educational program is used during the following:

– accreditation of the educational program, inspection of academic process in major and specialization;
– development of curriculum, syllabi and practices;
– development of diagnostic tools for the quality of higher education;
– determination of the training content in the system of retraining and advanced training;
– major-related professional orientation of students.

The educational program is subject to the requirements of the Law of Ukraine "On Higher Education" of 01.07.2014 No. 1556-VII (as amended), the Law of Ukraine "On Education" of 05.09.2017 No. 2145-VIII (as amended), the Resolution of the Cabinet of Ministers Of Ukraine "On approval of the National Qualifications Framework" of 23.11.2011 No. 1341 and establishes:

– number of ECTS credits required to complete the program;
– requirements for the level of education of individuals who can start training under the program;
– expected learning outcomes of students, including program competencies and learning outcomes;
– list and scope of academic disciplines for mastering the competencies of the educational program and their logical sequence;
– requirements for curriculum structure .

The educational program is used for the following:

– compilation of curricula and syllabi;
– compilation of individual plans of students;
– compilation of working programs of academic disciplines, practices;
– determination of the information base for compilation of diagnostic tools;
– accreditation of educational program;
– internal and external quality control of training;
– certification of bachelors in the educational program "Design, manufacture and certification of aircraft" in the specialty 134 "Aviation and rocket and space technology".

Users of the educational program:

– applicants for higher education studying at the National Aerospace University "Kharkiv Aviation Institute";
– scientific and pedagogical workers who train bachelors in the educational program "Design, manufacture and certification of aeronautical engineering" in the major 134 "Aerospace Engineering";

– Examination board of major 134 "Aerospace Engineering";
– Admissions committee of the National Aerospace University "Kharkiv Aviation Institute".

The educational program extends to the departments of the National Aerospace University "Kharkiv Aviation Institute" involved in the bachelor's degree training in the educational program "Design, manufacture and certification of aeronautical engineering in digital industry" in the major 134 "Aerospace Engineering".

1 REGULATORY REFERENCES

The educational program is developed on the basis of the following normative documents and recommendations:

1.1 Law of Ukraine "On Higher Education". No. 1556-UII of 01.07.2014 (as amended).

1.2 Law of Ukraine "On Education" No. 2145-VIII of 05.09.2017 (as amended).

1.3 Resolution of the Cabinet of Ministers of Ukraine "On approval of the License conditions for educational activities" of December 30, 2015 No. 1187.

1.4 Resolution of the Cabinet of Ministers of Ukraine "On approval of the National Qualifications Framework" of 23.11.2011 No. 1341.

1.5 Resolution of the Cabinet of Ministers of Ukraine "On approval of the list of branches of knowledge and specialties in which the training of higher education seekers" of 29.04.2015 No. 266.

1.6 Resolution of the Cabinet of Ministers of Ukraine "On approval of the Regulations on the procedure for exercising the right to academic mobility" dated 12.08.2015 No. 579.

1.7 Order of the Ministry of Education and Science of Ukraine "On approval of the Regulations on the accreditation of educational programs for which the training of applicants for higher education" of 11.07.2019 No. 977.

1.8 National Classifier of Ukraine. Classifier of professions DK 003:2010, approved by the order of Derzhspozhyvstandart of Ukraine of 28.07.2010 No. 327 (as amended).

1.9 Methodical recommendations on the development of higher education standards, approved by the higher education sector of the Scientific and Methodological Council of the Ministry of Education and Science of Ukraine, Minutes of 21.06.2019 No. 3 (Approved by the order of the Ministry of Education and Science of Ukraine of 01.10.2019 No. 1254)

1.10 Regulation "On the organization of the educational process" СУЯ ХАІ-НОВ-П/005:2016 of the National Aerospace University "Kharkiv Aviation Institute", approved by Academic Council of the University of 18.05.2016, minutes No. 10.

1.11 A Tuning Guide to Formulating Degree Program Profiles Including Program Competences and Program Learning Outcomes. -Bilbao, Groningen and The Hague, 2010.

1.12 A TUNING-AHELO conceptual framework of expected / desired learning outcomes in engineering. OECD Education Working Papers, No. 60, OECD Publishing 2011.http://dx.doi.org/10.1787/5kghtchn8mbn-en

1.13 National Qualifications Framework. Appendix to the Resolution of the Cabinet of Ministers of Ukraine of November 23, 2011 No. 1324.

1.14 Development of educational programs. Methodical recommendations / Author: V.M. Zakharchenko, V.I. Lugovyi, Yu.M. Rashkevysh, Zh. V. Talanova / Ed. V.G. Kremen. – Kyiv: State Enterprise "Prioritety", 2014. – 120 p.

1.15 Order of the Ministry of Education and Science of Ukraine "On the peculiarities of introduction of the list of field of study and majors in which students are trained, approved by the Cabinet of Ministers of Ukraine of April 29, 2015 No. 266" of 06.11.2015 No. 1151.

1.16 Classification of economic activities: DK 009: 2010. – Valid from 01.01.2012. – (National Classifier of Ukraine).

1.17 Classifier of professions: DK 003: 2010. – Valid from 01.11.2010. – (National Classifier of Ukraine).

1.18 National educational glossary: higher education / 2nd ed., Revised and amended / Author: V.M. Zakharchenko, C.A. Kalashnikov, V.I. Luhovy, A.B. Stavytsky, Yu.M. Rashkevych, Zh. V. Talanova / Ed.. V.G. Kremen. – Kyiv: Pleiades Publishing House LLC, 2014. - 100 p.

1.19 Standard of higher education in Ukraine of the first (bachelor's degree) level, field of study 13 «Mechanical engineering", major 134 "Aerospace Engineering". – Kyiv: Order of the Ministry of Education and Science of Ukraine 411441, 22.12.2018. – 14 p.

PROFILE OF EDUCATIONAL PROGRAM "DESIGN, PRODUCTION AND CERTIFICATION OF AERONAUTICAL ENGINEERING " IN THE MAJOR "AEROSPACE ENGINEERING"

1 - General information	
Full name of the higher educational institution and structural subdivision	National Aerospace University "Kharkiv Aviation Institute" Name of the structural unit - Faculty of Aircraft Engineering
Degree of higher education and title of qualification in the original language	Degree – Bachelor' Qualification: Bachelor in Aerospace Engineering under educational program «Design, manufacturing and certification of aeronautical engineering»
Official name of educational program	«Design, manufacturing and certification of aeronautical engineering »
Type of diploma and scope of educational program	**Bachelor's degree, single. On the basis of complete general secondary education, the volume of the educational program is 240 ECTS credits, the term of study is 3 years and 10 months. On the basis of the degree of "Junior Bachelor" (educational qualification level "Junior Specialist") ECTS credits received in the framework of previous training can be recognized and transferred: in major 134 "Aerospace Engineering" up to 60 ECTS credits; in other majors up to 30 ECTS credits**
Accreditation	Organization that accredited the program: Ministry of Education and Science of Ukraine. Accreditation certificate: UD series No. 21001693, issued on 20.02.2018, order of the Ministry of Education and Science of Ukraine of 15.07.2014 No. 2642l (based on the order of the Ministry of Education and Science of Ukraine of 19.12.2016 No.1565) according to the decision of the Accreditation Commission of 08.07. 2014, minutes No. 110. Accreditation period: 10 years (until July 1, 2024)
Cycle / level	NQF of Ukraine - level 7, FQ-EHEA - first cycle, EQF-LLL - 6 level
Prerequisites	A person has the right to obtain a bachelor's degree on the basis of complete general secondary education and on the basis of the degree of "junior bachelor"
Languages of instruction	The languages of instruction are Ukrainian and English. In order to create conditions for international academic mobility, it may be decided to teach one or more subjects in other foreign languages.
Term of the educational program	Four years
Internet address of permanent description of educational program	https://khai.edu/ua/education/osvitni-programi-i-komponenti/osvitni-programi-bakalavriv/
2 - Purpose of educational program	
Training of specialists capable of solving complex problems in professional activities related to the design, manufacture and certification of aircraft in terms of digital transformation, characterized by complexity and uncertainty of conditions	
3 - Characteristics of educational program	
Subject area	**Field of study**: "Mechanical Engineering". **Major**: "Aviation and rocket and space technology". **Objects of study**: phenomena and problems associated with the stages of the

	life cycle of aircraft. **Theoretical content of the subject area**: theoretical bases of development, production and certification of aviation equipment. **Methods, techniques and technologies**: analytical, numerical and experimental methods of research of problems of the subject area, in particular integrated computer technologies, methods and technologies connected with stages of a life cycle of aviation equipment. **Tools and equipment**: laboratory equipment with measuring instruments, in particular hydraulic stands, wind tunnels, equipment for research of material properties, stress-strain state of structures; tools and equipment for studying aircraft structures, helicopters, engines and power plants, onboard, navigation, electrical equipment; equipment used for manufacture, assembly and testing of aircraft structures; computers with specialized software, including computer calculation systems, geometric modeling, finite element analysis, integrated design and production of aircraft
Orientation of the educational program	Educational and professional program with emphasis on end-to-end study of computer-integrated methods of design, production and certification of aircraft inherent in the digital industry
Main focus of educational program	Mastering the latest methods of automated design, production and certification of aircraft based on advanced global industry practices
Program features	Bilingual – implemented in Ukrainian and English. It includes the option to choose minors with in-depth study of a range of disciplines in aerodynamics, strength, design and manufacture of aircraft in the digital industry. The practical training is carried out at the enterprises of aerospace engineering. International academic mobility is recommended but not required
4 –Employment and further training opportunities	
Employability	Graduates can work in the major in accordance with the qualification "Bachelor of Aerospace Engineering" and hold positions according to the classification of economic activities according to DK 009-2010: Section C - Processing industry. Section 30 - Manufacture of other transport equipment Group 30.3 - Manufacture of aircraft and spacecraft, related equipment Class 30.30 - Manufacture of aircraft and spacecraft, related equipment. In accordance with the curriculum graduates can perform professional work **according to** DK 003-2010: 311 Engineering specialists in the field of physical sciences and technology 3115 Engineering specialists - mechanics 314 Specialists who operate ships and aircraft and provide navigation and flights 3143 Flight specialists 3144 Air traffic controllers 3145 Air traffic engineers 3436.1 Assistants to heads of enterprises, institutions and organizations 3436.2 Assistants to heads of production and other major departments 3436.3 Assistants to managers of small businesses without management 3491 Laboratory assistants and engineers in other areas of research
Further training	A person has the right to continue education at the second (master's degree) level of education and to acquire additional qualifications in the system of postgraduate education.
5 – Training and assessment	
Training and studying	Student-centered training, self-study, problem-oriented learning is aimed at the development of critical and creative thinking, training through laboratory practice, dual education. Lectures, laboratory work, seminars, practical classes, independent work on the basis of textbooks and abstracts, consultations with teachers, preparation of qualifying paper.

Assessment	The assessment system of training outcomes is carried out on a 100-point system in accordance with the Regulations of the National Aerospace University "Kharkiv Aviation Institute" "On the rating of student achievement." Criteria for assessing knowledge in each discipline are approved by the relevant departments and communicated to students in the first lesson. The assessment system includes: – module control; – written exams and tests; – oral tests (in the form of defense of term papers and projects); – defense of final qualification paper. State certification for a bachelor's degree in the educational program "Design, manufacture and certification of aeronautical engineering" is conducted in the form of public defense of the diploma project
6 – Program competencies	
Integral competence	Ability to solve complex specialized and practical problems related to the design, manufacture and certification of aeronautical engineering, which involves application of theories and methods of certain sciences, specialized computer software and is characterized by complexity and uncertainty of conditions
General competence (GC)	GC1. Ability to communicate in the state language both orally and in writing. GC2. Ability to communicate in a foreign language. GC3. Skills for safe activities, commitment to preserve the environment. GC4. Skills in the use of information and communication technologies. GC5. Ability to work in a team. GC6. Ability to generate new ideas (creativity). GC7. Ability to make reasonable decisions. GC8. Ability to learn and master modern knowledge. GC9. Ability to exercise their rights and responsibilities as a member of society, to realize values of civil (free democratic) society and need for its sustainable development, rule of law, human rights and freedoms and the citizen of Ukraine. GC10. Ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies for recreational and healthy lifestyle
Major professional competencies (PC)	PC1. Ability to use theories of flight dynamics and control in the design of aircraft. PC2. Ability to use positions of hydraulics and aerodynamics to describe the interaction of bodies with gaseous and hydraulic media. PC3. Ability to assign optimal materials for aircraft structural elements. PC4. Ability to perform calculations of aircraft elements for strength. PC5. Ability to design, construct and test aircraft, its equipment, systems and subsystems. PC6. Ability to develop and implement technological processes of production of elements and objects of aeronautical engineering. PC7. Skills in the use of information and communication technologies and specialized software in study and professional activities. PC8. Ability to take into account economic and managerial aspects of the production of elements and objects of aeronautical engineering in professional activities. PC9. Ability to choose methods of calculation, design and production taking into account the characteristics of different types of aeronautical engineering. PC10. Ability to use the latest integrated computer technology in the creation (production) of aeronautical engineering

	PC11. Ability to use information and cybersecurity in the development and production of aeronautical engineering
7 - Program outcomes	
	PON1. Fluent oral and written communication in state and foreign languages on professional matters. PO2. Understanding environmentally hazardous and harmful factors of professional activity and adjustment of its content in order to prevent negative impact on the environment. PO3. Possession of means of modern information and communication technologies to the extent sufficient for training and professional activities. PO4. Ability to explain own decisions and the basis for their adoption to specialists and non-specialists in a clear and unambiguous form. PO5. Skills of self-study and autonomous work to improve professional skills and solve problems in a new or unfamiliar environment. PO6. Formation of substantiated assessments of the actions of state bodies and other political institutions from the standpoint of universal, democratic values, priority of human and civil rights and freedoms. PO7. Possession of logic and methodology of scientific knowledge based on an understanding of the current state and methodology of the subject area. PO8. Adherence to the requirements of industry regulations for procedures of design, manufacture, testing and (or) certification of elements and objects of aeronautical engineering at all stages of their life cycle. PO9. Ability to explain the influence of design parameters of aircraft elements on its flight characteristics. Operation of ideas of methods to ensure the stability and controllability of aeronautical engineering. PO10. Skills to determine the loads on the structural elements of aeronautical engineering. PO11. Understanding the principles of fluid and gas mechanics, in particular, hydraulics and aerodynamics. PO12. Ability to describe the structure of metals and nonmetals and knowledge of methods of modifying their properties. Ability to assign optimal materials for elements and systems of aeronautical engineering, taking into account their structure, physical, mechanical, chemical and operational properties, as well as economic factors PO13. Understanding the features of work processes in hydraulic, pneumatic, electrical and electronic systems used in aeronautical engineering. PO14. Ability to describe experimental methods for studying structural, physical-mechanical and technological properties of materials and structures. PO15. Application of modern methods of design, construction and production of elements and systems of aeronautical engineering in professional activities. PO16. Calculation of stress-strain state, determination of bearing capacity of structural elements and the reliability of systems of aeronautical engineering. PO17. Understanding and substantiating sequence of design, engineering, production, testing and certification of elements and systems of aeronautical engineering. PO18. Understanding the structure and principles of operation of onboard and navigation equipment of aeronautical engineering. PO19. Understanding and substantiating design features and basic aspects of work processes in systems and elements of aircraft PO20. Understanding the theoretical principles and practical methods of instrumental interchangeability of parts of aeronautical engineering. PO21. Skills to develop technological processes, including the use of computer-aided design, for the production of structural elements and systems of aeronautical engineering. PO22. Evaluation of the economic efficiency of production of elements and

	systems of aeronautical engineering. PO23. Understanding the features of calculations, design and production of various types of aeronautical engineering and substantiated selection of methods of their implementation. PO24. Skills to use the latest software packages used in the industry for calculations, design, construction and preparation for the production of elements of aeronautical engineering. PO25. Understanding the principles and practical methods of information and cybersecurity in the development and production of aeronautical engineering.
8 - Resource support for program implementation	
Staffing	Research and academic staff involved in training in professionally oriented disciplines with degrees and/or academic titles with qualifications that meet the licensing requirements. Employees of aerospace engineering enterprises are involved in training during practical classes and in case of implementation of the dual form of training.
Material and technical support	Training is carried out in training laboratories, computer classes of the National Aerospace University "Kharkiv Aviation Institute" and at the enterprises of the industry
Information and educational and methodical support	The use of virtual learning environment of the National Aerospace University "Kharkiv Aviation Institute", author's developments of scientific and pedagogical staff and enterprises of aerospace engineering industry.
9 – Academic mobility	
National credit mobility	Based on bilateral agreements between the National Aerospace University "Kharkiv Aviation Institute" with institutions of higher education and research institutions of Ukraine.
International credit mobility	Based on bilateral agreements between the National Aerospace University "Kharkiv Aviation Institute" and educational institutions of partner countries.
Training of foreign applicants for higher education	Training of foreign citizens is carried out in the state or English languages. For groups of foreign students, it may be decided to train one or more subjects in other foreign languages.

2 LIST OF EDUCATIONAL PROGRAM COMPONENTS OF (EPC) AND THEIR LOGICAL SEQUENCE

2.1 List of EP components

EPC code	Educational program components (academic disciplines, course projects (works), practices, qualification work)	Number of ECTS credits	Form of final control
1	2	3	4
Compulsory EP components			
General training cycle			
CC1	Foreign Language / Ukrainian as a foreign language	4	diff. credit
CC2	Business Ukrainian / Ukrainian as a foreign language	4	credit
CC3	Philosophy	3	credit
CC4	Law	4	credit
CC5	Chemistry and Basics of Ecology	3	credit
Professional training cycle of			
CC6	Materials Science	4	exam
CC7	Further mathematics	17.5	exam
CC8	Electrical Engineering	3	credit
CC9	Descriptive Geometry	4	exam
CC10	Theoretical Mechanics	8	exam
CC11	Thermodynamics and Heat Transfer	3	credit
CC12	Physics	10.5	exam
CC13	fundamentals of Aerospace Engineering	4	credit
CC14	Engineering and Computer Graphics	4	credit
CC15	Interchangeability and Standardization	3	credit
CC16	Machine Parts and Basics of Design	5	exam
CC17	Mechanics of Materials and Structures	9.5	exam
CC18	Theory of Mechanisms and Machines	5	credit
CC19	Technologies of Construction Materials	4	exam

CC20	Hydraulics	4.5	exam
CC21	Aerohydrodynamics	5	exam
CC22	Aircraft Aerodynamics	4	exam
CC23	Aircraft Aerodynamics (course project)	2	diff. credit
CC24	Flight dynamics	5.5	exam
CC25	Construction mechanics	8	exam
CC26	Aircraft strength	5	exam
CC27	Aircraft strength (course project)	2	diff. credit
CC28	Engineering calculations using MathCAD, MATLAB	4	credit
CC29	General Structure of Aircraft and Helicopters	4	exam
CC30	General Structure of Aircraft and Helicopters course project	2	exam
CC31	Design of Aircraft Elements	4	exam
CC32	Theoretical Foundations of Aircraft Engineering	4.5	exam
CC33	Aircraft production technology	4.5	exam
Practical training cycle of			
CC34	Introductory practical training	3	diff. credit
CC35	Educational practical training	3	diff. credit
CC36	Internship	3	diff. credit
	Total amount of practical training:	9	
Qualification paper			
CC37	Bachelor's thesis project	9	defense of a bache-lor's thesis project
	Total amount of compulsory components:	**179.5**	
Elective EP components			
Selective block of disciplines by minor *			
EC1-EC10	Disciplines by minor	40.5	
Elective disciplines **			
EC11	Elective discipline in humanities	4	credit

EC12	Selective discipline in economic cycle	4	exam
EC13	Selective discipline in information security cycle	4	exam
EC14	Elective discipline in in-depth special cycle	4	credit
EC15	Selective discipline in computer training cycle	4	credit
Total amount of elective components:		**60.5**	
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		**240**	

*** - Disciplines for minors are selected in blocks according to one of the following lists.**

** - Elective disciplines are selected separately from the relevant cycle of disciplines.

Elective block by minor "Aircraft Aerodynamics"			
EPC code	Components of the educational program	Number of ECTS credits	Form of final control
EC1	Flight Tests of Aircraft	4	exam
EC2	Flight Dynamics (course project)	2	differentiated credit
EC3	Design of Aircraft Elements	3	exam
EC4	Propeller Aerodynamics	4	exam
EC5	Modeling of Aircraft Objects	4	credit
EC6	Experimental Aerohydrodynamics	5	exam
EC7	Aircraft Systems and Equipment	4	exam
EC8	Aerodynamic Design of Aircraft	4	exam
EC9	Numerical Aerodynamics	5	exam
EC10	Integrated Computer-Aided Design Technologies	5.5	exam
	Total	40.5	
Elective block in minor "Testing and Certification of Aircraft"			
EC1	Reliability of Aircraft Structures	4	exam
EC2	Application of Computers in Mechanics	2	differentiated credit
EC3	Basics of Certification	3	exam
EC4	Stability and Oscillations of Elastic Systems	4	exam
EC5	Computer Design_SW	4	credit
EC6	Application of Computers in Mechanics	5	exam
EC7	Calculations of Aircraft Strength and Resource	4	exam
EC8	Survivability of aircraft structures	4	exam
EC9	Fundamentals of Metrology	5	exam
EC10	Experimental Research in Mechanics	5.5	exam
	Total	40.5	
Elective block in minor "Airplanes and Helicopters"			
EC1	Design of Aircraft Elements and Systems	4	exam
EC2	Design of Power Plants for Aircraft and Helicopters	2	differentiated credit
EC3	Aircraft Operation	3	exam
EC4	Design of Power Plants for Aircraft and Helicopters	4	exam
EC5	Modeling of Aeronautical Engineering Objects	4	credit

EC6	Construction of Units of Aircraft and Helicopters	5	exam
EC7	Aircraft Systems and Equipment	4	exam
EC8	Design of Landing Gear and Control Systems	4	exam
EC9	Technology of Production of Aircraft and Helicopters	5	exam
EC10	Integrated Computer-Aided Design Technologies	5.5	exam
	Total	40.5	

Elective block in minor " Aircraft Production "			
EC1	Automatic Design of Technological Equipment	4	exam
EC2	Automatic design of technological equipment (course project)	2	differentiated credit
EC3	Aircraft Operation	3	exam
EC4	Welding in Aviation	4	exam
EC5	Engineering Bases of Volume Modeling	4	credit
EC6	Integrated Computer-Aided Design Technologies	5	exam
EC7	Aircraft Systems and Equipment	4	exam
EC8	Fundamentals of Process Modeling	4	exam
EC9	Technology of Production of Aircraft and Helicopters	5	exam
EC10	Technology of Production of Aircraft and Helicopters	5.5	exam
	Total	40.5	
Elective disciplines in humanities			
EC11	Foreign language \ Ukrainian as a foreign language	4	credit
	Religious Studies	4	credit
	Discipline from the list of the university	4	credit
Selective discipline in economic cycle			
EC12	Business Economics	4	credit
	Organization of Production	4	credit
	Discipline from the list of the university	4	credit
Selective discipline in information security cycle			
EC13	Fundamentals of Cybersecurity of Industrial Systems	4	credit
	Information security management	4	credit
	Industrial Internet of Things	4	credit
Elective discipline in in-depth special cycle			
EC14	Fracture mechanics	4	credit
	Construction of Helicopter Assemblies	4	credit
	Fundamentals of Engineering Analysis of Aircraft Elements	4	credit
Selective discipline in computer training cycle			
EC15	Computer Design Tools	4	credit
	Virtual Reality Technologies	4	credit
	Fundamentals of C # programming	4	credit

3 STUDENT ASSESSMENT FORM

Assessment of graduates in the educational-professional program "Design, manufacture and certification of aeronautical engineering" in the major 134 "Aerospace Engineering" is carried out in the form of defense of qualifying paper and is deemed completed with the issuance of a standard document on awarding a student a bachelor's degree with a qualification: Bachelor of Aerospace Engineering in the major 134 "Aerospace Engineering".

Assessment is carried out on transparent and public basis.

4 MATRIX OF CORRESPONDENCE OF PROGRAM COMPETENCIES TO THE COMPONENTS OF THE EDUCATIONAL PROGRAM

Components of education program	Program competencies																			
	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11
CC1		X			X	X		X													
CC2	X				X	X		X													
CC3	X1)	X2)			X	X	X	X	X	X											
CC4	X1)	X2)			X	X		X	X												X
CC5	X1)	X2)	X		X	X		X													
CC6	X1)	X2)			X	X		X					X	X		X			X	X	
CC7	X1)	X2)			X	X		X			X	X	X	X	X		X		X		
CC8	X1)	X2)			X	X		X							X				X		
CC9	X1)	X2)		X	X	X		X							X		X				
CC10	X1)	X2)			X	X		X							X		X		X		
CC11	X1)	X2)			X	X		X						X	X				X		
CC12	X1)	X2)			X	X		X			X	X	X			X					
CC13	X1)	X2)			X	X		X		X											
CC14	X1)	X2)		X	X	X		X							X		X			X	
CC15	X1)	X2)			X	X		X							X	X					
CC16	X1)	X2)		X	X	X		X					X	X	X		X			X	
CC17	X1)	X2)			X	X		X					X	X	X	X					
CC18	X1)	X2)			X	X		X							X						
CC19	X1)	X2)	X		X	X		X								X		X	X		
CC20	X1)	X2)			X	X		X				X			X						
CC21	X1)	X2)			X	X		X				X			X		X		X		
CC22	X1)	X2)			X	X		X				X			X				X		
CC23	X1)	X2)		X	X	X	X	X			X	X					X				
CC24	X1)	X2)			X	X		X							X				X		
CC25	X1)	X2)			X	X		X						X	X						
CC26	X1)	X2)			X	X		X			X		X	X	X				X		
CC27	X1)	X2)		X	X	X	X	X					X	X			X				
CC28	X1)	X2)		X	X	X		X			X	X			X	X	X				
CC29	X1)	X2)			X	X		X							X				X		
CC30	X1)	X2)			X	X	X	X							X				X		
CC31	X1)	X2)			X	X		X					X	X	X		X			X	
CC32	X1)	X2)		X	X	X		X								X		X			
CC33	X1)	X2)	X		X	X		X								X		X			
CC34	X1)	X2)	X		X	X		X									X			X	
CC35	X1)	X2)	X		X	X		X								X	X			X	
CC36	X1)	X2)	X		X	X	X	X								X	X	X		X	X
CC37	X1)	X2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Components of education pro-gram	Program competencies																			
	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11
EC1	X1)	X2)		X3) 6)	X	X		X					X4)	X4) 5)	X3) 5) 6)	X6)	X6)		X4)	X5) 6)	
EC2	X1)	X2)		X4) 6)	X	X	X3) 5) 6)	X			X3) 5)		X4)	X4)	X3) 5) 6)	X6)	X3) 4) 5) 6)			X4) 5) 6)	
EC3	X1)	X2)			X	X		X	X4)											X3)	
EC4	X1)	X2)	X6)		X	X		X			X5)	X3)		X4)	X3) 4) 5)	X6)	X4) 5)			X4) 5)	
EC5	X1)	X2)		X4) 5) 6)	X	X		X					X5)	X5)	X4) 5) 6)	X6)	X3) 4) 5) 6)		X5)	X4) 5) 6)	
EC6	X1)	X2)		X4) 5)	X	X		X				X3)	X4) 5)	X4)	X3) 5) 6)	X6)	X4)		X6)	X4) 5) 6)	
EC7	X1)	X2)			X	X		X					X4)	X4)	X4) 5)		X4) 5) 6)		X4)	X4)	
EC8	X1)	X2)		X5) 6)	X	X		X			X3)	X3)	X5)	X4) 5)	X3) 4) 5)	X6)	X3)		X4)	X3) 5) 6)	
EC9	X1)	X2)	X6)	X3)	X	X		X				X3)			X3) 4)	X5) 6)	X3)	X5) 6)	X3)	X3)	
EC10	X1)	X2)	X6)	X3) 5)	X	X		X				X3)	X4)		X3) 4) 5)	X6)	X3) 5)	X6)	X3) 5)	X3) 5)	
EC11	X1)	X2)			X	X		X		X											
EC12	X1)	X2)			X	X		X							X	X					
EC13	X1)	X2)		X	X	X		X							X	X	X	X		X	X
EC14	X1)	X2)			X	X		X					X	X	X					X	
EC15	X1)	X2)		X	X	X		X							X	X	X			X	

1) for subjects trained in the state language
2) for subjects trained in English
3) for a minor *"Aircraft Aerodynamics "*
4) for a minor *"Testing and Certification of Aircraft"*
5) for a minor *"Aircraft and Helicopters"*
6) for a minor *"Aircraft Production"*

5 MATRIX OF CORRESPONDENCE OF PROGRAM OUTCOMES (PO) WITH RELEVANT EDUCATIONAL COMPONENTS OF THE EDUCATIONAL PROGRAM

Components of education program	Program outcomes																							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PO13**	**PO14**	**PO15**	**PO16**	**PO17**	**PO18**	**PO19**	**PO20**	**PO21**	**PO22**	**PO23**	**PO24**	**PO25**
CC1	X2)			X	X											X									
CC2	X1)			X	X											X									
CC3	X1) 2)			X	X	X	X																		
CC4	X1) 2)			X	X	X																			X
CC5	X1) 2)	X		X																					
CC6	X1) 2)			X			X					X		X	X	X					X		X	X	
CC7	X1) 2)			X							X	X	X	X			X		X				X		
CC8	X1) 2)			X			X						X				X	X	X				X		
CC9	X1) 2)		X	X													X								
CC10	X1) 2)			X					X								X						X		
CC11	X1) 2)			X						X						X	X						X		
CC12	X1) 2)			X			X			X	X	X	X	X		X		X	X		X				
CC13	X1) 2)			X			X											X							
CC14	X1) 2)		X	X											X		X							X	
CC15	X1) 2)			X				X									X			X	X				
CC16	X1) 2)		X	X				X		X		X		X	X		X							X	
CC17	X1) 2)			X						X		X		X			X				X				
CC18	X1) 2)			X						X							X								
CC19	X1) 2)	X		X																	X	X	X		
CC20	X1) 2)			X							X		X			X	X		X						
CC21	X1) 2)			X							X		X			X	X		X				X		
CC22	X1) 2)			X					X	X	X		X			X	X		X				X		
CC23	X1) 2)		X	X					X	X	X		X						X						
CC24	X1) 2)			X				X	X	X							X						X		
CC25	X1) 2)			X						X							X								
CC26	X1) 2)			X				X		X		X		X		X	X						X		
CC27	X1) 2)		X	X				X		X		X		X											
CC28	X1) 2)		X	X	X				X		X		X				X		X		X				
CC29	X1) 2)			X					X								X	X					X		
CC30	X1) 2)			X					X								X	X					X		
CC31	X1) 2)			X				X				X		X	X		X							X	
CC32	X1) 2)		X	X				X								X				X	X	X			
CC33	X1) 2)	X		X				X								X					X	X			
CC34	X1) 2)	X		X	X			X							X									X	
CC35	X1) 2)	X		X	X			X							X					X	X			X	
CC36	X1) 2)	X		X	X			X	X						X			X		X	X	X		X	X
CC37	X1) 2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Components of education program	Program outcomes																								
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PO13**	**PO14**	**PO15**	**PO16**	**PO17**	**PO18**	**PO19**	**PO20**	**PO21**	**PO22**	**PO23**	**PO24**	**PO25**
EC1	X1) 2)		X3) 6)	X				X				X4)		X3)	X5) 6)	X4) 5)	X3) 5) 6)				X6)		X4)	X5) 6)	
EC2	X1) 2)		X4) 6)	X				X	X3)	X3) 4)		X4)			X4) 5) 6)	X4)	X3) 5) 6)				X6)			X4) 5) 6)	
EC3	X1) 2)			X				X						X4)	X3)									X3)	
EC4	X1) 2)	X6)		X				X		X3) 4)	X3)		X3)		X4) 5)	X4)	X3) 4) 5)		X3)		X6)			X4) 5)	
EC5	X1) 2)		X4) 5) 6)	X				X		X5)		X5)			X4) 5) 6)	X5)	X4) 5) 6)				X6)		X5)	X4) 5) 6)	
EC6	X1) 2)		X4) 5)	X				X		X4)	X3)	X4) 5)	X3)	X3)	X4) 5) 6)	X4)	X3) 5) 6)		X3)		X6)		X6)	X4) 5) 6)	
EC7	X1) 2)			X				X		X4)		X4)			X4)	X4)	X4) 5)	X5) 6)					X4)	X4)	
EC8	X1) 2)		X5) 6)	X				X	X3) 5)	X4) 5)	X3)	X5)	X3)		X3) 5) 6)	X4) 5)	X3) 4))	X5)	X3)		X6)		X4)	X3) 5) 6)	
EC9	X1) 2)	X6)	X3)	X				X		X3)	X3)		X3)	X4)	X3)		X3) 4)		X3)		X5) 6)	X5) 6)	X3)	X3)	
EC10	X1) 2)	X6)	X3) 5)	X				X		X4)	X3)	X4)	X3)	X3) 4)	X3) 5)		X3) 4) 5)		X3)		X6)	X6)	X3) 5)	X3) 5)	
EC11	X1) 2)			X	X	X																			
EC12	X1) 2)			X		X											X				X				
EC13	X1) 2)		X	X				X							X		X				X	X		X	X
EC14	X1) 2)			X				X		X		X			X	X	X							X	
EC15	X1) 2)		X	X											X		X				X			X	

1) for subjects trained in the state language
2) for subjects trained in English
3) for a minor *"Aircraft Aerodynamics"*
4) for a minor *"Testing and Certification of Aircraft"*
5) for a minor *"Aircraft and Helicopters"*
6) for a minor *"Aircraft Production"*