

PROFESSIONAL PROGRAM "GEOGRAPHIC INFORMATION SYSTEMS
AND TECHNOLOGIES" SPECIALIZATION 193 "GEODESY AND LAND
MANAGEMENT"

	General information
Full name of higher educational institution and structural unit	National Aerospace University named after. M. Ye. Zhukovsky "Kharkiv Aviation Institute" Department of geoinformation technologies and space monitoring of the Earth
Level of Higher Education The first (Bachelor) level	Level of Higher Education The first (Bachelor) level
Higher education	Bachelor
The official name of the educational and professional program	Earth Sciences. Space monitoring of the EarthEarth Sciences. Earth space monitoring
Type of diploma and the volume of the educational-professional program	Bachelor's degree, unitary, 240 ECTS credits, term of training 3 years 10 months
Presence of accreditation Primary accreditation in 2020	Presence of accreditation Primary accreditation in 2020
Prerequisites	A person has the right to obtain a bachelor's degree provided that he has completed secondary education
Language (s) of teaching	The language of teaching is the state language.In order to create conditions for international academic mobility, a decision may be made to teach one or more disciplines in English and / or other foreign languages, while ensuring

	knowledge of the relevant discipline in the state language
The purpose of the educational program	Training of highly skilled specialists (bachelors) in the field of Earth Sciences, whose competencies meet the modern requirements of employers and the prospect of work in the labor market.

Subject area	
Orientation of the educational-professional program	Educational and professional program for preparation of bachelors
The main focus is educational-professional program	Modern models, methods, algorithms, technologies, processes and methods for obtaining, storing, processing, analyzing and presenting geodata on the basis of system methodology in order to solve complex specialized problems and practical problems in the Earth sciences from professional activity or in the process of learning
Features of the program	Practice is carried out at enterprises of various sectors of the national economy
Suitability for employment	Professional activity as a specialist in space monitoring of the Earth. Professional activity in the fields of geological exploration, topographic and geodetic works, hydrology, meteorology, geography, and others. Graduates can work in professions according to the National Classification of Professions DK 003: 2010: 3417 - appraiser (expert valuation of property), appraiser-expert; 3214-technician-land surveyor, technician-cartographer; 3118 - technician-topographer, technician-topographer cadastral; 3123 - technician-photogrammetrist
Further training	Continuation of training according to the program of preparation. Second level of higher education (master's degree)

	5- Teaching and evaluation
Teaching and learning	Student-centered learning, self-study, problem orientation training is aimed at developing critical and creative thinking, teaching through laboratory practice, dual, distance education, etc. Lectures, multimedia lectures, laboratory works, seminars, practical classes in small groups, independent work on the basis of textbooks and notes, consultations with teachers, preparation of baccalaureate work. Student-centered learning, self-study, problem orientation training is aimed at developing critical and creative thinking, teaching through laboratory practice, dual, distance education, etc. Lectures, multimedia lectures, laboratory works, seminars, practical classes in small groups, independent work on the basis of textbooks and notes, consultations with teachers, preparation of baccalaureate work.
Evaluation	Written Exams, Practical Reports, Presentations, Current (Modular) Control, Baccalaureate Work and Its Protection Written exams, practice reports, presentations, current (module) control, bachelor's work and its protection..
	6 - Program competencies
Integral competence	Ability to solve complex specialized problems and practical problems in the professional activity of the subject area of Earth Sciences or in the process of learning using modern theories and methods of studying natural and anthropogenic objects and processes using a complex of interdisciplinary data and under conditions of insufficient information.
General competence (GC)	GC5 - the ability to use information technology; GC 6 - the ability to learn and to be modern educated, to realize the possibility of learning throughout life; GC 7 - the ability to work independently and in a team; 3K8 - skills of safety of life; GC 9 - the desire to preserve the natural environment and ensure sustainable development of society;

	GC 10-recognition of moral and ethical aspects of research and the necessity of intellectual honesty, as well as professional codes of conduct.
Professional competence of specialty (PC)	<p>PC1 - the ability to apply knowledge and understanding of the main characteristics, processes, history and composition of the Earth as a natural system;</p> <p>PC2 - the ability to apply basic knowledge of physics, chemistry, biology, ecology, mathematics, information technologies, etc. in studying the Earth and its geosphere;</p> <p>PC3 - ability to use knowledge of general engineering sciences in teaching and professional activity, ability to use their theories, principles and technical approaches;</p> <p>PC4 - the ability to collect, record and analyze data using appropriate methods and technological tools in field and laboratory conditions;</p> <p>PC5 - the ability to choose methods, tools and equipment for the purpose of carrying out professional activities in the field of Earth sciences;</p> <p>PC6 - the ability to integrate field and laboratory observations with the theory in sequence: from observation to recognition, synthesis and modeling.</p> <p>PC7 - ability to be able to use modern geodetic, navigational, geoinformation and photogrammetric software and equipment;</p> <p>PC8 - the ability to independently collect, process, simulate and analyze geospatial data in the field and in the office;</p> <p>PC9 - the ability to aggregate field, camera and distance data on a theoretical basis in order to synthesize new knowledge in the field of Earth sciences;</p> <p>PC10 - the ability to design projects and programs, organize and plan field work, prepare technical reports and draw up field, camera and distance research results;</p> <p>PC11-ability to identify and classify known and register new</p>

	objects in geospheres, their properties and inherent processes.
	7 - Program learning outcomes
PLO1	Use oral and written technical Ukrainian language and be able to communicate in a foreign language (in English) in the field of Earth sciences.
PLO 2	Know the theoretical foundations of geodesy, higher geodesy, topographical and thematic mapping, mapping and updating, Earth remote sensing and photogrammetry, land management, real estate valuation and land cadastre;
PLO 3	Know the legal and regulatory framework for the issues of rational use, protection, accounting and valuation of land at the national, regional, local and economic levels, procedures for state registration of land plots, other real estate objects and restrictions on their use.
PLO 4	To apply methods and technologies of creation of state geodetic networks and special engineering geodetic networks, topographic surveys of the terrain, topographic and geodetic measurements for research, design, construction and operation of engineering structures, public, industrial and agricultural complexes using modern ground and aerospace methods.
PLO 5	Use methods of collecting information in the field of geodesy and land management, its systematization and classification in accordance with the project design or production task;
PLO 6	To use geodetic and photogrammetric equipment and technologies, methods of mathematical processing of geodetic and photogrammetric measurements.
PLO 7	To use methods and technologies of land management planning, territorial and economic land management, planning of land use and protection, cadastral removal and state land cadastre maintenance.
PLO 8	To develop land management, land survey and cadastral documentation and land valuation documentation, map and prepare cadastral data using computer technologies,

	geographic information systems and digital photogrammetry.
PLO 9	To process results of geodetic measurements, topographical and cadastral surveys, using geoinformation technologies and computer software and database management system;
PLO 10	Own technologies and methods of planning and performing geodetic, topographic and cadastral removals and computer processing of the results of filming in geographic information systems;
PLO 11	Demonstrate the ability to conduct independent studies of natural objects and processes in geospheres in field and laboratory conditions.
PLO 12	Know and apply theories, paradigms, concepts and principles in Earth sciences
	8 – Resource support for the implementation of the program
Personnel support	Scientific and pedagogical staff involved in the teaching of professionally oriented disciplines have academic degrees and / or academic titles and meet the licensing requirements.
	9 - Academic mobility
National Credit Mobility	It meets the technological requirements for ensuring the implementation of educational activities in the field of higher education in accordance with the current legislation of Ukraine
Teaching foreign applicants for higher education	On the basis of bilateral agreements between the National Aerospace University named after. M.E. Zhukovsky "Kharkiv Aviation Institute" and technical institutions of Ukraine. – - State Enterprise "Antonov" (Contract No. 1/11 dated March 25, 2016, the term of validity is 3 years).
International Credit Mobility	On the basis of bilateral agreements between the National Aerospace University named after. M.Ya. Zhukovsky "Kharkiv Aviation Institute" and educational institutions of partner countries. ERASMUS +, namely academic mobility

	from the University of the Basque Country and the Ecole Centrale de Nantes.
Teaching foreign applicants for higher education	Training of foreign citizens is provided in the state language or in English. If the training is conducted in the state language, then in certain cases it may be decided to teach one or several disciplines in English and / or other foreign languages, while ensuring knowledge of the students of the relevant discipline in the state language..

LIST OF THE COMPONENT OF THE EDUCATIONAL PROFESSIONAL PROGRAM (CP) AND THEIR LOGICAL CONNECTION

3.1 List of components of OP

code CPC	Components of the educational program (study disciplines, course projects (work), practice, qualifying work)	Number of credits	Form of the final control
1	2	3	4
Compulsory components of OP			
OP1	Foreign Language	3	credit
OP2	Foreign Language	4	dif credit
OP3	History and culture of Ukraine	3	credit
OP4	Ukrainian language (professional direction)	3	credit
OP5	Humanitarian discipline at the student's choice	3	credit
OP6	Philosophy	3	credit
OP7	Algorithmic foundations of geomatics and systemology	4	credit
OP8	Algorithmic foundations of geomatics and systemology	5	exam
OP9	Higher mathematics	4	exam
OP10	Higher mathematics	6	exam
OP11	Physics	4	exam

OP12	Geology and geomorphology	4	exam
OP13	Probability Theory and Mathematical Statistics	3	credit
OP14	Geodesy	6,5	exam
OP15	Geodesy	5,5	exam
OP16	Geodesy (KP)	2	dif credit
OP17	Higher geodesy	4	exam
OP18	Photogrammetry and remote sensing	7,5	exam
OP19	Photogrammetry and remote sensing (KP)	2	dif credit
OP20	Digital Image Processing	7,5	exam
OP21	Digital Image Processing (KP)	2	dif credit
OP22	Cartography	5,5	exam
OP23	Technologies of geographic information systems	4	exam
OP24	Technologies of geographic information systems	4,5	credit
OP25	Geographic information systems and databases	6	exam
OP26	GPS-технології	5,5	exam
OP27	Protection of spatially-distributed data in computer systems	3,5	exam
OP28	Designing geospatial databases	6,5	exam
OP29	Fundamentals of land management and cadastre	4	exam
OP30	GIS analysis	7	exam
OP31	GIS analysis (KP)	2	dif credit
OP32	Technologies of geographic information systems (KP)	2	dif credit
OP33	Cartographic design	4	exam
OP34	Geomarketing	5	credit

OP35	Expert valuation of land	5	exam
OP36	BC, labor protection and civil protection	4	credit
OP37	Business Economics	4	credit
OP38	Educational practice	3	credit
OP39	Practical practice	3	credit
OP40	Internship	3	credit
OP41	Graduation work (project) of bachelor's degree	9	protection of the qualification work of the bachelor
Total volume of mandatory components:		177,5	

3.3 Structure of the curriculum for the semesters and content of the components of the OP

№	Code	Name of component	Goal and objective
The first semester			
1	OP1	Foreign language	<p>Goal: to acquire knowledge of a foreign language for the study of disciplines of a specialty in a foreign language.</p> <p>Objective: to study the main terms of the specialty with the help of a foreign language.</p>

2	OP7	Algorithmic foundations of geomatics and systemology	Objective: to improve the basic knowledge of computer science received by students in the previous educational institutions, to provide new knowledge about methods and technologies for developing algorithms of computing processes and their implementation by means of modern object-oriented programming languages of a high level, as well as studying the conceptual foundations of systemology.
3	OP9	Higher mathematics	<p>Goal: deep knowledge of the basic methods of higher mathematics, which will provide the logic of mathematical thinking students.</p> <p>Objective: studying the basic methods of higher mathematics for further use in disciplines associated with mathematical models and optimization methods.</p>
4	OP12	Geology and geomorphology	<p>Goal: to study the main forms and laws of the development of relief on the conditions of their formation, as well as physico-geological processes occurring on the surface of the Earth and the methodology of geological and geomorphological studies.</p> <p>Objective: the study of geological processes, the composition of the earth's crust, the history of its development to determine the genetic type of relief, its age and prediction of neotectonics.</p>

5	OP14	Geodesy	<p>Goal: acquisition of basic knowledge about modern methods of geodetic measurements, technologies and means, as well as algorithms for their processing, processes and decisions, carried out in research, design, construction and operation of engineering structures.</p> <p>Objective: to study the methods of obtaining geodata using geodetic instruments and processing of spatial data under the control of geographic information systems.</p>
6	OP11	Physics	<p>Goal: deep knowledge of the basic laws of physics, which ensure the correct setting of the tasks of control and management of physical signs.</p> <p>Objective: to study the basic laws, methods and models for further use in disciplines of the specialty.</p>
The second semester			
7	OP2	Foreign language	<p>Goal: to acquire knowledge of a foreign language for the study of disciplines of a specialty in a foreign language.</p> <p>Objective: to study the basic terms of the specialty for help with foreign language.</p>
8	OP3	History and culture of Ukraine	<p>Goal: studying the history and culture of Ukraine. Ukraine's place in the development of world culture.</p> <p>Objective: To teach students to use historical facts in professional activities as well as in society.</p>

9	OP4	Ukrainian language (professional direction)	<p>Goal: to teach students to communicate in the state language in professional activities, as well as in society.</p> <p>Objective: to study the main terms of the specialty in the state language for use in professional activities.</p>
10	OP10	Higher mathematics	<p>Goal: deep knowledge of the basic methods of higher mathematics, which will provide the logic of mathematical thinking students.</p> <p>Objective: to study the basic methods of higher mathematics for further use in disciplines related to mathematical models and methods of optimization.</p>
11	OP8	Algorithmic foundations of geomatics and systemology	<p>Objectives: the implantation of knowledge on the basis of systemology, the skills of developing algorithms of computing processes and their implementation by means of high-level programming languages.</p>
12	OP15	Geodesy	<p>Objective: to study the methods of obtaining geodata using geodetic instruments and processing of spatial data under the control of geographic information systems.</p>
13	OP16	General ecology	<p>Objective: to apply the norms of laws and regulations in the process of natural-protective activities and assess the environmental pollution of the territory.</p>
14	OP17	Educational practice	<p>Objective: to acquire skills and abilities during geodetic and navigational measurements for geodesy and land</p>

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