(Ф 03.02 – 107)

MINISTRY OF EDUCATION AND SCIENCE

National Aviation University

EDUCATIONAL AND PROFESSIONAL PROGRAM

«Ecology and Environmental Protection»

of the second (Master) level of higher education

Specialty	**101 «Environmental Sciences»**
Field of Study	**10 Natural Sciences**

QMS NAU ОП 10.02.03 – 03 – 2021

Educational and Professional Program
is approved by the Academic Council of the University
Minutes No.*4* of *21.04.2021*

Put into effect by the Rector's Order
Rector M. Lutskiy

Order No. *246/од* of *29.04.2021*

KYIV

Standard of Higher Education of Ukraine: second (Master) level, field of study 10 "Natural Sciences", specialty 101 "Environmental Sciences".
The Standard of Higher Education was approved and put into effect by the order of the Ministry of Education and Science of October 4, 2018, No. 1066.

APPROVAL PAGE

of the Educational Program

AGREED

By the Scientific and Methodical Board

National Aviation University

Minutes No.*3* of *20.04.2021*

Head of the NAU the Scientific and Methodical Board

Vice Rector for Academics

Anatolii POLUKHIN

AGREED

Academic Council of the Faculty of Environmental Safety, Engineering and Technologies

Minutes No. *3* of *25.03.2021*

Head of the Academic Council of the Faculty of Environmental Safety, Engineering and Technologies

Iryna MATVIEIEVA

AGREED

Department of Environmental Sciences

Minutes No. *4* of *24.03.2021*

Head of the Department of Environmental Sciences

Valeriy FROLOV

AGREED

Student Council of the Faculty of Environmental Safety, Engineering and Technologies

Minutes No. *5* of *22.03.2021*

Head of Student Council of the Faculty of Environmental Safety, Engineering and Technologies

Victoria FILIMONIUK

PREFACE

It was developed by the working group of the Educational and Professional Program (specialty 101 Environmental Science, year of admission – 2021 and subsequent ones until the new edition of the educational program) consisting of:

Guarantor of the Educational and Professional Program:

Dudar T.V. – D.Sc., Senior Researcher, Ass. Prof., Associate Prof. of the Department of Environmental Sciences

MEMBERS OF THE WORKING GROUP:

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Saienko T.V. - D.Sc., Prof., Prof. of the Department of Environmental Sciences

Hai A.Y. – PhD., Ass. Prof., Ass. Prof. of the Department of Environmental Sciences

Zhuravel O.A. – student of the Master's Degree program, specialty 101 "Environmental Science"

EXTERNAL STAKEHOLDER

Popov M.O. – Corresponding Member of the of the National Academy of Sciences of Ukraine, D.Sc., Prof., Head of the Center (State Institution "Scientific Centre for Aerospace Research of the Earth of the Institute of Geological Sciences of the National Academy of Sciences of Ukraine").

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Reviews of the external stakeholders (attached)

Document level – 3b
The Planned term between revisions – 1 year
Master copy

1. Profile of the Educational and Professional Program

Part 1. General Information		
1.1	Full name of the Higher education institution and structural unit	National Aviation University Faculty of Environmental Safety, Engineering and Technologies, Department of Environmental Sciences
1.2	The degree of higher education and the name of the educational qualification	Master Master of Environmental Sciences
1.3	Official name of the educational and professional program	Ecology and Environmental Protection
1.4	Type of diploma and scope of Educational and Professional Program	Master's degree, single, 90 ECTS credits, period of study - 1 years 4 months (full-time education) Study periods of foreign students are determined by separate orders of the university in accordance with regulations in the field of higher education.
1.5	Accreditation institution	Ministry of Education and Science of Ukraine State Accreditation Commission of Ukraine Certificate of accreditation Series УД№11008105 dated January 08, 2019.
1.6	Accreditation period	until July 1, 2024
1.7	Program cycle/level	Level 7 of the National Qualifications Framework of Ukraine (NQF of Ukraine), second cycle of the European Higher Education Area (FQ-EHEA), level 7 of the European Qualifications Framework for Lifelong Learning (EQF-LLL).
1.8	Prerequisites	Bachelor's Degree
1.9	Mode of study	Institutional: full-time, part-time education
1.10	Languages of training	Ukrainian, English
1.11	Internet address of the permanent posting of the description of the EPP	www.febit.nau.edu.ua www.nau.edu.ua
Part 2. The purpose of the Educational and Professional Program		
2.1	Training of specialists competent in finding comprehensive solutions of complex tasks and problems, developing environmental protection measures, conducting fundamental and applied research, performing organizational and technical work in the field of ecology, environmental protection and balanced nature management. EPP "Ecology and Environmental Protection" corresponds to the mission of NAU, which emphasizes the contribution of NAU to the development of society at the national and international levels through the generation of new knowledge and innovative ideas based on both the integration and internationalization of education, research and practice, and the provision of high-quality educational and scientific research services to citizens of Ukraine and foreigners in the training of environmentalists. The EPP has no analogues among the higher education institutions of Ukraine in terms of taking into account the industry context of the functioning of the aviation sector.	
Part 3. Characteristics of the Educational and Professional Program		
3.1	Subject area (Object of activity, theoretical	***Object of activity:*** structure and functional connections of ecosystems of different levels and origins; anthropogenic

	content)	impact on natural environment and sustainable natural resources management. ***Theoretical content of the subject area:*** concepts, terms, principles of natural sciences, modern ecology and environmental sciences and their use for environmental protection, natural resources management and sustainable development.
3.2	Orientation of the Educational and Professional Program	The program has an academic orientation. The educational and professional program is based on well-known provisions, results of modern research and new knowledge on technologies of environment protection and management, necessary for the future professional activity of Master in Environmental Sciences, able to solve certain problems and tasks, using the system of competencies.
3.3	The main focus of the Educational and Professional Program	Training of specialists in ecology and environmental protection for the fields of: research, production, public and higher education. Keywords: ecology, environmental protection, natural resources management, environmentalization, anthropogenic impact.
3.4	Features of the Educational and Professional Program	The educational and professional program is developed on the basis of a student-centered approach, which is implemented through the individualization of education The program provides in-depth practical training, applied research at micro and/or macro levels, fluency in the state and foreign languages with the possibility of studying in English, as well as internships abroad. It is focused on development of research competences and training of modern scientists and research engineers in the field of ecology and environmental protection. The difference of the program from others is the formation of professional competencies according to international standards with the possibility of obtaining relevant professional certificates. 90 percent of master's courses are original and innovative in nature.
Part 4. Admission of graduates to employment and further education		
4.1	Employment	Graduates can provide services related to scientific research and experimental development in the field of natural sciences, as well as consulting services related to environmental protection. The professional activity of graduates in the field of ecology and environmental protection, natural resource management, rational use of nature and sustainable development can be carried out in educational institutions, institutions and organizations of various forms of ownership.
4.2	Further education	The program is aimed at continuing education and obtaining higher qualification levels and scientific degrees, which corresponds to the eighth qualification level of the National Qualifications Framework, with the awarding of the first scientific degree of the third level of higher education - doctor

		of philosophy; acquisition of additional qualifications in the postgraduate education system.
Part 5. Teaching and evaluation		
5.1	Teaching and learning (methods, techniques, technologies, tools and equipment)	***Methods, means and technologies:*** Problem-oriented learning, which involves formulating and solving a problem during lectures, solving situational problems at seminars, practical classes, researching a problem during independent work of students. Practice-oriented training through various types of practices at enterprises, institutions and organizations of various forms of ownership on the basis of contracts. These training courses are organized according to the principle of continuity. Performance of practical and laboratory work in production conditions. Distance learning technologies are used to give classes and conduct conferences, seminars, business games, laboratory works, workshops and other forms of educational classes, using web technologies. Information technologies of education: the work of students in specialized classrooms equipped with multimedia complexes, which provides the possibility of conducting interactive lectures and virtual laboratory works, the use of search methods for acquiring new knowledge, the organization of project work, conducting online testing. Project-based learning technologies are implemented through the completion of a master's thesis, which is essentially a project. ***Tools and equipment***: equipment, hardware and software necessary for field, laboratory and remote studies of the structure and properties of ecological systems of various levels and origins.
5.2	Evaluation	Written exams, tests, laboratory reports, practical classes reports, defense of term papers, reports on practical work and qualification paper, qualification exam.
Part 6. Program competencies		
6.1	Integral competencies (IC)	The ability to solve complex tasks and problems in the field of ecology, environmental protection and natural resources management during professional activities or in the learning process, which involves conducting research and/or implementing innovations, and are characterized by the complexity and uncertainty of conditions and requirements.
6.2	General competencies (GC)	GC01. Ability to learn and master modern knowledge. GC02. Ability to make informed decisions. GC03. Ability to generate new ideas (creativity). GC04. Ability to develop and manage projects. GC05. Ability to communicate in a foreign language. GC06. Ability to search, process and analyze information from various sources. GC07. Ability to motivate people and move towards a

		common goal.
6.3	Professional Competencies (PC)	*Competencies, defined by the standard of higher education of the specialty:* PC01. Awareness about the latest achievements, necessary for research and/or innovative activities in the field of ecology, environmental protection and balanced nature management. PC02. Ability to apply interdisciplinary approaches in the critical analysis of environmental problems. PC03. Ability to use the principles, methods and organizational procedures of research and/or innovation activities. PC04. Ability to apply new approaches to the analysis and forecasting of complex phenomena, dealing with problems in professional activity. PC05. Ability to demonstrate knowledge and own conclusions to specialists and non-specialists. PC06. Ability to manage the strategic development of the team in the process of carrying out professional activities in the field of ecology, environmental protection and balanced nature management. PC07. Ability to organize work related to the assessment of the state of environment, environmental protection and optimization of nature use, under the conditions of incomplete information and conflicting requirements. PC08. Ability to self-educate and improve skills based on innovative approaches in the field of ecology, environmental protection and balanced nature management. PC09. Ability to develop environmental projects independently via creative application of existing and generation of new ideas. PC10. Ability to assess the level of negative impacts of natural and anthropogenic factors of environmental hazards on the environment and people. PC 11. Ability to integrate knowledge from other fields, apply systematic approach and geo-information technologies when solving engineering problems and conducting scientific research on environmental protection (including the aviation sector).
Part 7. Program learning outcomes		
7.1	Program Learning Outcomes (PLO)	PLO01. To know and understand fundamental and applied aspects of environmental sciences. PLO02. To be able to use conceptual environmental regularities in professional activities. PLO03. To know the basic concepts of natural science, sustainable development and the methodology of scientific knowledge at the level of the latest achievements. PLO04. Know the legal and ethical standards for evaluating professional activity, developing and implementing socially significant environmental projects under the conditions of

		conflicting requirements. PLO05. Demonstrate the ability to organize collective work and implement complex environmental protection projects, taking into account available resources and time constraints. PLO06. To know the latest methods and instrumental means for studying environment, including methods and means of mathematical and geo-informational modelling. PLO07. To be able to communicate in a foreign language in the scientific, industrial and social fields of activity. PLO08. Be able to clearly and unambiguously convey professional knowledge, substantiations and conclusions to specialists and the general public. PLO09. Know the principles of personnel and resource management, basic approaches to decision-making under the conditions of incomplete/insufficient information and conflicting requirements. PLO10. Demonstrate awareness of the latest principles and methods of environmental protection. PLO11. Be able to use modern information resources on ecology, nature management and environmental protection. PLO12. Be able to assess landscape and biological diversity and analyze the consequences of anthropogenic impact on natural environments. PLO13. Be able to assess the potential impact of man-made objects and economic activities on the environment. PLO14. Apply new approaches to developing a decision-making strategy in complex, unpredictable conditions. PLO15. Assess environmental risks under conditions of insufficient information and conflicting requirements. PLO16. Choose the optimal economic use and/or nature management strategy depending on environmental conditions. *Additional program results* PLO17. Critically interpret theories, principles, methods and concepts from various subject areas to solve applied tasks and problems of environmental sciences. PLO18. Be able to use modern methods of information processing and interpretation when carrying out innovative activities. PLO19. Be able to independently plan the implementation of an innovative task and formulate conclusions based on its results. PLO20. To master fundamentals of environmental engineering design and ecological expert assessment of the impact on the environment. PLO 21. Use knowledge from other fields, apply a systematic approach and geo-information technologies when solving engineering problems and conducting research on environmental protection (including the aviation sector).
Part 8. Resource provision for program implementation		

8.1	Staff	The staff of the Department providing training for Master's Degree meets the requirements of the paragraph 30 of the Licensing requirements to the provision of educating services (Decree of the Cabinet of Ministers of Ukraine dated December 30, 2015 No. 1187 with changes). The implementation of the programs is provided by the staff scientific and pedagogical practitioners of NAU with academic ranks and degrees. Highly qualified specialists from enterprises, institutions and organizations working in the field are involved if practical training of students. All the member of the staff regularly take the qualification advancement courses, participate in trainings and workshops, including foreign ones.
8.2	Material and technical resources	The material and technical base of the graduation Department of Environmental Science is sufficient for the provision of the training specialists at the second (master's) level of higher education by the EPP and includes: - provision of PC workplaces and applied software is sufficient for the implementation of educational plans; - all computers of the department are connected to the local network of the university with the Internet access; - the Department is equipped with sufficient office equipment (printers, MFPs, scanners) to maintain documentation and provide teaching and methodical materials for the educational process; - educational laboratories are equipped with instruments and specialized software, necessary devices and equipment. All premises comply with building and sanitary standards, dormitories are provided for everyone who needs them. The existing social infrastructure includes a sports complex, food outlets, creative center, medical center and recreation center.
8.3	Information and educational and methodological support	Provision with manuals and tutorials, access to professional periodicals, access to digital library catalog and the possibility of working with electronic textbooks are provided by the funds of the Scientific and Technical Library of the NAU. Relevant information and educational and methodological support is located on the educational platforms Google Classroom, Moodle (Modular Object-Oriented Dynamic Learning Environment)
Part 9. Academic mobility		
9.1	National credit mobility	It is based on bilateral agreements on cooperation in the field of education and science, agreements on cooperation between the National Aviation University and higher education and research institutions in Ukraine: Agreement No. 689 dated 06.04.2020 On cooperation between the National Aviation University and the National Technical University "Dniprovska Polytechnic"
9.2	International credit	Mobility options with the following higher education

	mobility	institutions are accessible: 1. Ondokuz Mayis University (Turkey) 2. Technical University, Kosice (Slovakia) 3. Gediminas Vilnius Technical University (Lithuania) 4. Eskişehir Technical University (Turkey) 5. Lodz University of Technology (Poland) Internship as part of the Erasmus+ mobility program is also available.
9.3	Education of foreign students	Foreigners and stateless persons living in Ukraine legally have the right to pursue higher education under an educational and professional program on an equal basis with citizens of Ukraine on the basis of international treaties. Foreigners may enroll Master's degree program provided that they have mastered the language of study at the level sufficient for learning the educational material. For this purpose, such persons are given the opportunity to take a one-year course of the language of training and fundamental subjects at the preparatory department of the NAU. Upon successful completion of language training, foreigners receive a certificate of completion of the preparatory department for foreigners and stateless persons. Foreigners are enrolled in the educational and professional program at NAU based on the results of the interview. Order of the Ministry of Education and Culture of Ukraine dated November 13, 2019 No. 982-l granting permission to train foreigners and stateless persons.

2. List of components of the Educational and Professional Program and their logical sequence

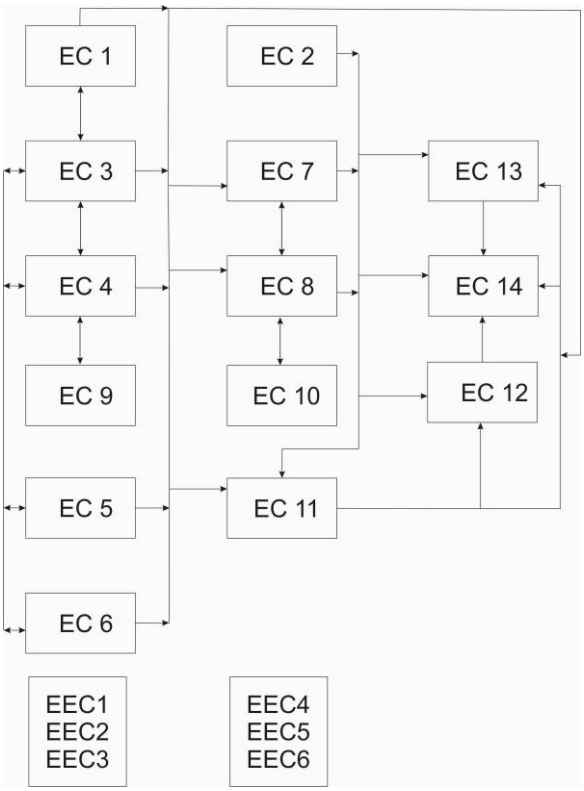
2.1. List of EPP components

Subject's Code	Components of the educational and professional program (subjects, term paper (projects), practices, qualification thesis)	ECTS credits	Final evaluation type	Semester (by mode of study)	
				Full-time	Part-time
1	2	3	4	5	6
Compulsory components of the EPP					
EC1	Philosophical Problems of Scientific Cognition	3,5	Graded test	1	1
EC2	Business Foreign Language	3,0	Examination		1
				2	2
EC3	Methodology of Applied Research in the Field of Environmental Sciences	3,5	Graded test	1	1
EC4	System Analysis of Environment Quality	3,0	Examination	1	1
EC5	Remote Sensing Methods for Environmental Protection	3,5	Examination	1	1
EC6	Environmental Safety of Aviation Enterprises	3,5	Graded test	1	1

Subject's Code	Components of the educational and professional program (subjects, term paper (projects), practices, qualification thesis)	ECTS credits	Final evaluation type	Semester (by mode of study)	
				Full-time	Part-time
1	2	3	4	5	6
Compulsory components of the EPP					
EC7	Environmental Impacts Assessment	6,0			1
			Examination	2	2
EC8	Substantiation of Environmental Projects	5,5			1
			Examination	2	2
Term Paper and Course Project					
EC9	System Analysis of Environment Quality	1	Defence	2	2
EC10	Substantiation of Environmental Projects	1,5	Defence	2	2
Practices					
EC11	Research Practice in the Field of Ecology and Environmental Protection	1	Defence	2	2
EC12	Pre-diploma Training	1	Defence	3	3
Final evaluation					
EC13	Qualification Exam	1,5	Examination	3	3
EC14	Qualification Thesis	19,5	Defence	3	3
Total amount of compulsory components		**66 ECTS credits**			
Elective components of the EPP					
Elective components *					
EEC 1	Subject 1	4,0	Graded test		
…	….				
EEC 6	Subject 6	4,0	Graded test		
Total amount of elective components		**24 ECTS credits**			
Total scope of the EPP		**90 ECTS credits**			

**The realization of the right of higher education seekers to freely choose academic subjects and create an individual educational trajectory is regulated by the Law of Ukraine "On Higher Education" and internal regulations of the NAU. Elective components are chosen by students of higher education from catalogs of recommended and alternative elective subjects.*

2.2. Structural and Logical Scheme of the Educational and Professional Program



3.3. Form of the final student evaluation

Form of the final student assessment	Evaluation of graduates is performed in the form of Qualification Exam and public defence of the Qualification Thesis
Requirements to the Qualification Exam	The Qualification Exam must assess the learning outcomes of the graduates from the second (Master's) level of the specialty 101 "Environmental Science" in accordance with the educational program.
Requirements to the Qualification Thesis	The Qualification Master's Thesis involves solving a complex problem in the field of environmental protection, which is accompanied by research and/or the application of innovative approaches. The Qualification Master's Thesis must not contain academic plagiarism, fabrication and falsification. The Qualification Master's Thesis must be published before the defense at the official website of the graduation department and the repository of the Scientific and Technical Library of the National Aviation University. Publication of qualification works containing information with limited access is carried out in accordance with the requirements of current legislation. Defense must be done openly and publicly.

4. Matrix of the correspondence between competencies and components of the Educational and Professional Program

Subjects / Competencies	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC9	EC10	EC11	EC12	EC13	EC14	BK1	BK2	…	BK6
IC	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
GC01	x				x			x		x	x	x	x	x				
GC02	x		x	x		x	x	x	x	x	x	x	x	x				
GC03	x		x					x		x	x	x	x	x				
GC04						x		x		x		x		x				
GC05		x									x	x		x				
GC06			x	x	x	x	x	x	x	x	x	x		x				
GC07	x						x	x		x	x	x		x				
PC01			x					x		x	x	x	x	x				
PC02	x		x	x	x	x	x		x		x	x	x	x				
PC03	x		x					x		x	x	x		x				
PC04	x		x	x	x	x	x		x		x	x	x	x				
PC05	x	x	x	x			x	x	x	x	x	x	x	x				
PC06								x		x				x				
PC07				x	x	x	x	x	x	x	x	x		x				
PC08	x							x		x	x	x		x				
PC09						x		x		x		x		x				
PC10	x				x	x	x					x	x	x				
PC11	x		x	x	x	x	x		x		x	x		x				

5. Matrix of the Learning outcomes provision by the corresponding components of the Educational and Professional Program

Subjects / Program learning outcomes	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC9	EC10	EC11	EC12	EC13	EC14	BK1	BK2	…	BK6
PLO1			x	x	x	x	x	x	x	x	x	x	x	x				
PLO2			x	x	x	x	x	x	x	x	x	x	x	x				
PLO3	x		x	x		x		x	x	x	x	x	x	x				
PLO4	x					x		x		x		x	x	x				
PLO5			x				x	x		x	x		x	x				
PLO6			x	x	x				x		x	x	x	x				
PLO7		x									x		x	x				
PLO8	x	x	x	x			x	x	x	x	x	x	x	x				
PLO9	x					x		x		x			x	x				
PLO10						x	x	x		x		x	x	x				
PLO11		x	x	x	x			x	x	x	x	x		x				
PLO12				x	x		x		x			x	x	x				
PLO13					x	x	x					x	x	x				
PLO14	x					x	x	x		x		x	x	x				
PLO15				x				x	x	x		x	x	x				
PLO16				x		x	x	x	x	x		x	x	x				
PLO17	x		x	x	x	x		x	x	x	x	x		x				
PLO18			x	x	x				x		x	x		x				
PLO19	x		x		x			x		x	x	x	x	x				
PLO20						x	x	x		x		x	x	x				
PLO21	x		x	x	x	x	x		x		x	x		x				