

MINISTRY OF DEFENCE OF UKRAINE
NATIONAL DEFENCE UNIVERSITY OF UKRAINE



EDUCATIONAL AND SCIENTIFIC PROGRAM

“Armaments and military equipment”

third (educational and scientific) level of higher education

Speciality	255 Armaments and military equipment
Area of expertise	25 Military sciences, national security, state border security

APPROVED BY THE SCIENTIFIC COUNCIL
OF THE NATIONAL DEFENCE UNIVERSITY
OF UKRAINE

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PREFACE

The educational and scientific programme ‘Armaments and Military Equipment’ of the third (educational and scientific) level of higher education for the preparation of Doctors of Philosophy in the field of ‘Military Sciences, National Security, State Border Security’ in the speciality ‘Armaments and Military Equipment’ is developed in accordance with the requirements of the Law of Ukraine ‘On Higher Education’ (as amended), resolutions of the Cabinet of Ministers of Ukraine of 23. 03.2016 № 261 ‘Procedure for the training of applicants for the degree of Doctor of Philosophy and Doctor of Science in higher education institutions (research institutions)’ (as amended) and from 23. 11.2011 No. 1341 ‘On Approval of the National Qualifications Framework’ (as amended by the Resolutions of the Cabinet of Ministers of Ukraine No. 509 of 12.06.2019 and No. 519 of 25.06.2020) and the Order of the Ministry of Defence of Ukraine No. 65 of 15.02.2019 ‘On the Distribution of the Main Areas of Scientific Research between Scientific Institutions, Higher Military Educational Institutions, Military Educational Units of Higher Educational Institutions of the Ministry of Defence of Ukraine and the Armed Forces of Ukraine’.

The educational and scientific programme ‘Armaments and Military Equipment’ is developed taking into account the recommendations and recognised scientific practices of scientific education of the European Education Area, in particular: Salzburg Principles (Salzburg I Conclusion and Recommendation from the Bologna Seminar on ‘Doctoral Programmes for the European Knowledge Society’, 2005 & Salzburg II ‘Initiative Recommendations of the European University Association’, 2010).

Developed by the working group in the following composition:

Professor of the Department of Logistics of the Institute of Logistics and Support of Troops (Forces) of the National Defence University of Ukraine, Doctor of Technical Sciences, Professor Oleh VOROBIOV;

Head of the Department of Air Force Logistics of the Institute of Aviation and Air Defence of the National Defence University of Ukraine, Candidate of Military Sciences, Associate Professor, Colonel Valentyn DYPTAN;

Head of the Air Force Department of the Institute of Aviation and Air Defence of the National Defence University of Ukraine, Candidate of Technical Sciences, Senior Researcher, Colonel Pavlo OPENKO;

Leading Researcher at the Department of Aviation and Air Defence Applications of the Institute of Aviation and Air Defence of the National Defence University of Ukraine, PhD in Engineering, Senior Researcher Oleksii MAISTROV;

Leading Researcher at the Research Department of Military Specialist Training Problems of the Research Department of Military Education and Science Development Problems of the Centre for Military Strategic Studies of the National Defence University of Ukraine, PhD in Pedagogy, Professor Andrii ZELNYTSKYI.

Guarantor of the educational and scientific programme:

Professor of the Department of Logistics of the Institute of Troops (Forces) Support of the National Defence University of Ukraine, Doctor of Technical Sciences, Professor Oleh VOROBIOV;

Stakeholders involved:

Deputy Head of the University for Scientific Work, Candidate of Military Sciences, Professor Major General Pavlo SHCHYPANSKYI;

Associate Professor of the Department of Aviation of the Institute of Aviation and Air Defence of the National Defence University of Ukraine, PhD, Colonel Yevhen HONCHARENKO;

Associate Professor (full-time) of the Scientific and Methodological Centre for Organisation of Scientific and Technical Activities of the National Defence University of Ukraine, Colonel Yevhen SMYCHENKO.

Reviewers (external stakeholders):

Leading Researcher of the Research Department for the Development of Armaments and Military Equipment of the Special Operations Forces of the Research Department for the Development of Armaments and Military Equipment of the Land Forces of the Central Research Institute of Armaments and Military Equipment of the Armed Forces of Ukraine, Doctor of Technical Sciences, Senior Researcher Anatolii GURNOVYCH;

Head of the Department of Engineering Support and Technical Means of Border Protection of the Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine, Doctor of Technical Sciences, Professor, Colonel Vadym SIVAK;

Head of the Research Department for Development Problems of the Armed Forces of Ukraine of the Central Research Institute of the Armed Forces of Ukraine Doctor of Military Sciences, Senior Researcher Colonel Oleh PAVLOVSKYI.

1. Profile of the Educational and Scientific Programme

1 – General information	
Full name of the HEI and the institute/ faculty	National Defence University of Ukraine
Degree of higher education and title of qualification in the original language	Doctor of Philosophy in Military Science, National Security, State Border Security, specialising in Arms and Military Equipment
Official name of the study programme	Armaments and Military Equipment
Diploma type and scope of study programme	Doctor of Philosophy Diploma in the field of 'Military Sciences, National Security, State Border Security' with a specialization in 'Armament and Military Equipment,' single-cycle, 46 ECTS credits. Program duration: 4 years
Accreditation status	Accredited
Level according to the NQF	NQF of Ukraine – 3rd cycle / Level 8 QF-EHEA – 3rd cycle / EQF-LLL – Level 8
Prerequisites	Availability of the second (master's) level of higher education. The requirements for admission are determined by the Rules of Admission to the National Defence University of Ukraine, approved by the Academic Council of the University
Language(s) of Teaching	Ukrainian and English
Duration of the Educational Program	Before updating or introducing a new educational programme due to changes in the regulatory framework, based on the results of accreditation, at the request of the military commissioning entity (no more than the accreditation period)
Internet address of the permanent website of the educational programme	https://nuou.org.ua/

2 – Objective of the educational programme	
<p>To ensure the training of highly qualified specialists in the speciality ‘Armaments and Military Equipment’ who are competent to conduct scientific and pedagogical, research and innovation activities and to obtain conceptual and methodological knowledge that will allow solving significant problems of development of armaments and military equipment for the needs of the security and defence sector of Ukraine.</p>	
3 – Characteristics of the educational programme	
Subject area (field of knowledge, speciality, specialisation)	<p><i>The objects of study</i> are advanced conceptual and methodological knowledge of research and professional nature in the field of armaments and military equipment.</p> <p><i>Learning objectives:</i> to acquire the ability to solve significant problems in the field of armaments and military equipment, to initiate, plan, implement and adjust a consistent process of thorough scientific research in compliance with proper academic integrity, critical analysis, evaluation and synthesis of new and complex ideas.</p> <p><i>Theoretical content of the subject area</i> - basic laws, regularities, categories, concepts, principles, methods, models, information technologies used to ensure the functioning and development of weapons and military equipment of the security and defence sector of Ukraine.</p> <p><i>Methods, techniques and technologies:</i> analysis, synthesis, system analysis, mathematical methods, modelling and information technologies of scientific research in the field of armaments and military equipment.</p> <p><i>Tools and equipment:</i> information and analytical tools, management support and decision-making systems, specialised software.</p> <p>(25 Military sciences, national security, state border security, 255 Arms and military equipment)</p>
Orientation of the educational programme	<p>Academic.</p> <p>The educational and scientific programme has an applied orientation with an emphasis on developing the competences necessary to solving complex, integrated, topical problems, creation of new knowledge in the course of professional scientific and pedagogical or research activities, to training of highly qualified specialists (theorists and</p>

	and experimenters) in the field of research of theoretical scientific, technical and technological problems that arise at the stages of creation (development and production), operation, restoration and utilization of weapons and military equipment, including ammunition, in the field of military sciences, national security, state border security border security for the needs of the security and defence sector of Ukraine.
Main focus of the educational programme and specialisation	<p>The educational and scientific programme is aimed at training highly qualified specialists capable of solving significant problems of the state's military-technical policy, expanding and reassessing existing knowledge and professional practices based on conceptual and methodological knowledge in the field of military sciences, national security and state border security.</p> <p>Keywords: conceptual problems, weapons, military equipment, military applied research, modelling.</p>
Programme peculiarities	<p>The peculiarity of the programme is the training of specialists capable of solving significant problems of military-technical policy, taking into account the strategic course of the country. The programme allows the applicant to form an individual educational trajectory; enables the applicant to balance their knowledge of research, scientific and pedagogical, scientific and practical, scientific and organisational activities, and ensures their professional development as a military specialist-scientist.</p>
4 – Suitability of graduates for employment and further education	
Suitability of graduates for employment	Graduates are employed as research and teaching staff in higher military educational institutions and research institutions.
Further education	Obtaining a doctoral degree. Advanced training.
5 – Teaching and assessment	
Teaching and studying	Student-centred approach, acquisition of 'Soft Skills' throughout the study in the educational program, problem-oriented and subject-subject learning, self-learning, research-based learning, pedagogical (research) practice, consultations, learning using modern information technology systems, experimental-research work, publication of articles related to the dissertation research topic, approval of dissertation research results.

	The main types of activities include lectures, group sessions, seminars, practical classes, consultations, and independent work.
Assesement	Current control (surveys, individual tasks for the preparation of parts of the dissertation research). Final control (exams, tests). Public defence of scientific achievements in the form of a dissertation.
6 – Programme competences	
Integral competence	Ability to solve complex theoretical and practical problems in the field of Military Science, National Security, State Border Security that arise at the stages of creation (development and production), operation, restoration and disposal of weapons and military equipment. Deep rethinking of existing and creation of new holistic knowledge, professional practice, innovation in the interests of the security and defence sector of Ukraine.
General competences	GC01. Ability to search, process and analyse information from various sources. GC02. Ability to think critically, generate new complex ideas, analyse and synthesise holistic knowledge. GC03. Ability to organise and conduct original research. GC04. Ability to communicate with the scientific community in order to present the results of scientific research and their publication in the state, English and/or other foreign languages. GC05. Ability to carry out scientific and pedagogical activities in the field of military science, national security, state border security. GC06. Ability to act on the basis of ethical considerations and academic integrity.
Special (professional) competences	SC01. Ability to use the acquired scientific, theoretical and applied knowledge to study and conduct research on the state of existing models and complexes of weapons and military equipment of the Armed Forces of Ukraine and advanced countries of the world. SC02. Ability to work with scientometric databases in order to carry out their own scientific research and the ability to use Internet technologies to organise and support their own scientific, pedagogical and innovative activities, in the preparation of scientific publications, reports, business and personal documentation. SC03. Ability to use information technologies of distance

	<p>learning in their own pedagogical activities, in the organisation and conduct of scientific events (conferences, scientific seminars, workshops, etc.). Ability to work effectively in a team.</p> <p>SC04. Ability to work with experts, gain knowledge from them and use it in practice.</p> <p>SC05. Ability to develop and improve theoretical and experimental methods for determining the feasibility of using new physical principles, technical solutions and technological processes in the creation of promising and improved elements, components and samples of weapons and military equipment.</p> <p>SC06. Ability to conduct research on the possibilities and ways to improve existing and create new elements, components, models of weapons and military equipment, improve their tactical, operational, economic, environmental and ergonomic characteristics.</p>
7 – Programme learning outcomes	
<p>General and professional training</p>	<p>PLO01. To search, process, analyse and summarise information for independent scientific research in the field of armaments and military equipment.</p> <p>PLO02. Reasonably choose and use methods and tools of scientific research in the field of armaments and military equipment, taking into account the latest world achievements of science and technology.</p> <p>PLO03. Possess in-depth knowledge in the field of armaments and military equipment, including understanding of theoretical and practical problems, history of development and current state of scientific knowledge, critical analysis of basic concepts, mastery of scientific terminology.</p> <p>PLO04. To acquire universal skills of a researcher in the field of armaments and military equipment, including the use of modern information technologies in scientific activities, management of scientific projects and/or preparation of proposals for funding research, registration of intellectual property rights.</p> <p>PLO05. Possess language competences sufficient to present and discuss the results of their scientific work in a foreign language (English or another in accordance with the specifics of the specialty) in oral and written form, as well as to fully understand foreign language scientific texts on weapons and military equipment.</p> <p>PLO06. Acquisition of knowledge and understanding of the in-depth level in the construction and operation of models and</p>

	<p>complexes of weapons and military equipment, the level of this knowledge should be sufficient to conduct scientific research based on the latest world achievements and aimed at their expansion and deepening.</p> <p>PLO07. Modern advanced conceptual and methodological knowledge in the field of research and/or professional activity and on the border of subject areas of knowledge.</p> <p>PLO08. Thorough knowledge of the subject area and understanding of the profession.</p> <p>PLO09. To know the works of leading foreign scientists, scientific schools and fundamental works in the field of research, to formulate the purpose of their own scientific research</p> <p>PLO10. Know the principles of research funding and the structure of estimates for its implementation, the ability to prepare a request for funding, reporting documentation.</p> <p>PLO11. Knowledge of methods of development and implementation of samples and complexes of weapons and military equipment.</p> <p>PLO12. Knowledge of the methodological principles of creating samples and complexes of weapons and military equipment.</p> <p>PLO13. Ability to critical thinking and, on its basis, to continuous self-development and self-improvement throughout life.</p>
8 – Resource support for programme implementation	
Personnel support	Academic and research staff with a high level of professional and academic qualifications are involved in conducting training sessions within the framework of the educational and scientific programme.
Logistical support	<p>It meets the technological requirements for the material and technical support of educational activities in the field of higher education in accordance with the current licensing requirements of the Ministry of Education and Science of Ukraine.</p> <p>To implement the programme, the university's classroom facilities (lecture rooms, computer labs), library (including an electronic library) with a reading room, a scientific centre for distance learning, a centre for simulation modelling, the Internet and the intra-academic network Moodle are used free of charge.</p> <p>There are sports grounds, a stadium, a swimming pool of the Ministry of Defence of Ukraine, a medical unit, and canteens for organising life and leisure.</p>
Information and educational-methodical support	<p>The information and educational and methodological support comply with the Licence Terms, as evidenced by the following indicators:</p> <ul style="list-style-type: none"> - provision of the library with the necessary number of domestic

	<p>and foreign professional periodicals of the relevant or related profile;</p> <ul style="list-style-type: none"> - availability of access to databases of periodicals in English of the relevant or related profile; - availability of the official website of the NPO, which contains the basic information about its activities in full, available in English, as well as adapted for persons with disabilities; - all the necessary documents for the educational programme are available (educational and professional programme, curricula, work programmes of academic disciplines (syllabuses), practical training programme, methodological materials for the final certification of higher education students, etc.) <p>In addition, all the necessary information is available on the National Defence University of Ukraine distance learning platform.</p> <p>Students have access to information and teaching materials free of charge.</p>
9 – Academic mobility	
National credit mobility	It is carried out in accordance with agreements and memorandums of scientific and technical cooperation with the institutions of the National Academy of Sciences of Ukraine, higher education institutions, military educational units of higher education institutions and scientific organisations.
International credit mobility	International credit mobility and international educational, scientific and technical cooperation of educational institutions is ensured in accordance with the Law of Ukraine ‘On Higher Education’, signed agreements, memoranda and other applicable legal acts regulating these issues, in particular: Cooperation Agreement with the Academy of Education of Vytautas the Great University (Vilnius); Memorandum with the NATO Defence College (Rome, Italy); Memorandum with the NATO School (Oberammergau, Germany); Cooperation Agreement with the Military Polytechnic School of the Ministry of National Defence of the People's Democratic Republic of Algeria; Cooperation Agreement with the National University of Defence of Poland; NATO DEEP - Ukraine Education and Science Cooperation Programme; Associate Partnership with ESDC (European Security College, Brussels); Associated partnership with ADL Initiative (USA)
Training of foreign higher education students	Under separate agreements within the framework of educational and research projects.

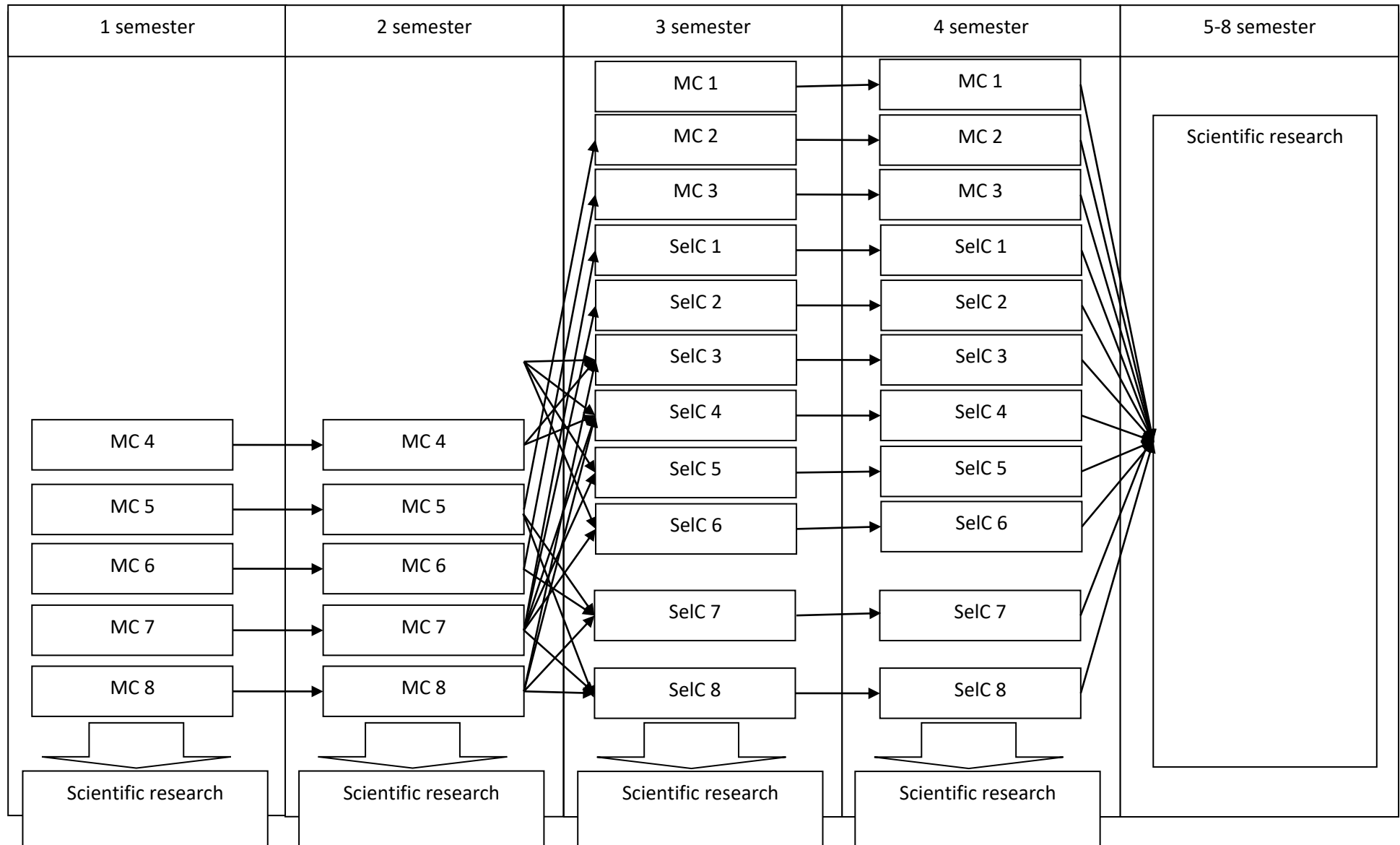
2. The list of educational and scientific program components and its logical sequence

2.1. The list of educational and scientific program components

Code	Components of the educational and scientific program	Number of credits	Form of Control
Mandatory components of the educational and scientific program			
1. Gaining in-depth knowledge of weapons and military equipment			
MC 1	Conceptual problems of weapons and military equipment	4	Credit
OK 2	Theoretical foundations of military science research in the field of armaments and military equipment	4	Credit
OK 3	Fundamentals of modelling in the field of armaments and military equipment	4	Credit
2. Obtaining general scientific (philosophical) competencies			
OK 4	Philosophy and methodology of science	3	Examination
OK 5	Modern pedagogical rhetoric	3	Examination
OK 6	Teaching Methods in Higher Military Schools	3	Credit
3. Obtaining universal research skills			
OK 7	Application of modern information technologies in scientific activities	3	Examination
4. Gaining language competencies			
OK 8	Foreign language in scientific activities	6	Examination
5. Practice			
OK9	Pedagogical (research) practice	4	Report
Total amount of required components		34	
5. Scientific component			
	Scientific research	194	Defence
Selective components of educational and scientific program			
1. Gaining in-depth knowledge of weapons and military equipment			
SelC 1	Fundamentals of intellectual property	3	Credit

SelC 2	Fundamentals of theoretical and practical research on the use and development of weapons and military equipment	3	Credit
2. Obtaining general scientific (philosophical) competencies			
SelC 3	Realization of Military-Technical Policy in the Armed Forces of Ukraine	3	Examination
SelC 4	Modern methods of decision support	3	Examination
3. Obtaining universal research skills			
SelC 5	Methods of military applied research and modeling, application packages (programs)	3	Examination
SelC 6	Fundamentals of assessing the effectiveness of management processes and their optimization	3	Credit
4. Practice (selective)			
SelC 7	Pedagogical practice	3	Report
SelC 8	Research practice	3	Report
Total amount of selected components of the PhD student		12	
Total amount of the educational component of the educational and scientific program		46	
TOTAL AMOUNT OF TRAINING OF THE PHD STUDENT		240	
<p>Selective components of academic disciplines. The applicant chooses academic disciplines from the list of selective disciplines from this educational and scientific program or other educational programs. Or the applicant can form his block of selective disciplines. Moreover, the applicant has the right to choose individual modules (topics) in academic disciplines in agreement with the teacher and supervisor, the form and procedure for reporting for a separate module (topic). The total amount of elective components is not less than 12 ECTS credits.</p>			

2.2. Organizational and logical scheme of the educational and scientific program.



**3. Form of final certification of higher education applicants
Public defence of scientific achievements in the form of a dissertation.**

Attestation is carried out openly and publicly, subject to the requirements of the legislation of Ukraine in the field of state secret protection.

A mandatory condition for admission to the defence is the successful completion of the individual curriculum and individual research plan by the applicant.

Attestation is completed by issuing a document of the established form on awarding the degree of Doctor of Philosophy to the applicant.

4. Matrix of correspondence of program competencies to the components of the educational and scientific program

	MC1	MC2	MC3	MC4	MC5	MC6	MC7	MC8	MC9	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8
GC0 1				+			+		+						+		+
GC0 2	+	+							+					+			+
GC0 3	+														+		
GC0 4					+			+	+							+	
GC0 5						+			+							+	
GC0 6										+							
SC0 1			+						+			+	+	+			+
SC0 2		+		+			+										
SC0 3					+		+										
SC0 4			+						+			+					+
SC0 5	+								+		+		+				+
SC0 6		+	+						+		+						+

6. The volume of the dissertation

The volume of the dissertation should be 110-155 pages (from 4.5 to 7 author's sheets), formed in accordance with the requirements established by the Ministry of Education and Science.

The total volume of the dissertation does not include figures and illustrations that completely occupy the page space. One author's sheet is equal to 40 thousand printed symbols, including numbers, punctuation marks, spaces between words, which is about 24 pages of printed text when the dissertation is prepared by computer using the Word text editor: font - Times New Roman, font size - 14 pt.

The dissertation is printed on one or two (optionally) sides of a sheet of white A4 paper (210x297 mm) with 1.5 line spacing.

Font Size – Mitel (14 typographic points). It is allowed to prepare a dissertation in LaTeX format with the appropriate style.

The dissertation text must be printed with the following margin sizes: left - no less than 20-25 mm, right - no less than 10 mm, top - no less than 20 mm, bottom - no less than 20 mm.

7. List of research areas for higher education applicants

7.1 Areas of research on the creation and improvement of WME.

- 1. Theoretical foundations and methods of justification and planning of the development of weapons and military equipment (WME).**
- 2. Theoretical foundations and methods for justifying requirements for systems (complexes, models) of WME.**
- 3. Development and improvement of theoretical and experimental methods for determining the feasibility of using new physical principles, technical solutions, and technological processes in the creation of prospective and the improvement of existing models, complexes, and systems of WME.**
- 4. Development and improvement of theoretical foundations for the analysis, synthesis, and optimization of structures, characteristics, and mathematical support of systems (complexes, models) of WME and their components.**
- 5. Research on the possibilities and methods for improving existing and creating new elements, components, models, complexes, and systems of WME, enhancing their tactical, operational, economic, environmental, and ergonomic characteristics.**
- 6. Theoretical foundations and methods for technical justification of requirements for systems (complexes, models) of WME, individual components, blocks, units, and systems. Development and improvement of methods for**

evaluating and controlling the characteristics and indicators of weaponry and military equipment models, as well as their individual units and systems.

7. Development and improvement of methods and scientific-technical proposals for increasing the combat effectiveness of WME systems (complexes) and the structures they are equipped with.

8. Development and improvement of effective methods for the combat use of models, complexes, and systems of weaponry and military equipment, taking into account the functioning of systems supporting combat operations.

9. Development and improvement of methods for testing WME, as well as justification of the composition and characteristics of testing support means.

7.2 Areas of research on standardization and metrology of WME

1. Development of the general theory of military standardization, unification, and metrology as a system of knowledge about the ways and methods of forming a rational nomenclature of systems (complexes, models) of weapons and military equipment, their components, and spare parts, and ensuring their compatibility.

2. Research on theoretical and scientific-technical problems of standardization and unification.

3. Development of the theory and methodology for substantiating and controlling the implementation of requirements for standardization, unification, and metrology.

4. Development of standardization methods for the testing phase of weapons and military equipment.

5. Research on theoretical and scientific-technical problems of classification, coding, and cataloging of weapons and military equipment to address military standardization and unification tasks.

6. Research on problems of metrological support for weapons and military equipment.

7. Development of a methodological framework for evaluating the effectiveness of measures for standardization, unification, and metrological support of weapons and military equipment.

7.3 Areas of research on the operation and restoration of WME

1. Development of methodology and research related to substantiating, forming, and improving systems for the operation and restoration of weapons and military equipment; logistics support for the processes of operation and restoration of weapons and military equipment.

2. Research related to the development and improvement of methods and means for managing the operation, technical condition, and restoration of weapons and military equipment.

3. Development of methods and means for restoration, maintenance, and disposal of weapons and military equipment.

4. Research related to the improvement of methods and means of controlling weapons and military equipment used in the process of operation and restoration

(repair), as well as methods for forecasting, diagnosing, and identifying the causes of changes in the technical condition of weapons and military equipment during operation. Development of methods for selecting the rational composition of tools for the operation and repair of weapons and military equipment.

5. Research related to ensuring the safety of operating and restoring weapons and military equipment.

6. Research related to the evaluation and justification of: systems supporting the processes of operation and restoration of weapons and military equipment; nomenclature, composition, echeloning, and organization of the operation of operation and repair means, etc., designed for the operation and restoration of weapons and military equipment, including in combat conditions.

7. Research related to the justification, evaluation, and improvement of training and simulation tools for the operation and restoration of weapons and military equipment, and the development of methods to enhance the effectiveness of their use.

7.4 Areas of research on the protection of WME from detection systems and weapons

1. Development of the theory of physical fields of weapons and military equipment.

2. Creation of new and improvement of existing methods for studying the physical fields of weapons, military equipment, and their revealing features.

3. Development of tactical methods for reducing, distorting, and simulating the parameters of physical fields of weapons, military equipment, and their revealing features.

4. Development of technical methods and means for reducing, distorting, and simulating the parameters of physical fields of weapons, military equipment, and their revealing features.

5. Development of methods for assessing the capabilities of enemy detection (reconnaissance, situational awareness) systems and weapons.

6. Development and improvement of theories and methods for evaluating the effectiveness of measures for stealth and protection of weapons and military equipment through physical fields.

7. Development and improvement of the theoretical foundations and methods of active, dynamic, and other types of protection for weapons and military equipment from detection systems and weapons.

8. Development and improvement of methods for the combat application of protection means for weapons and military equipment from detection systems and weapons.