MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

SCIENTIFIC STUDY PROGRAM

MATERIALS SCIENCE

Level of higher education third (educational and scientific)

Degree of higher education Doctor of Philosophy

Knowledge area 13 Mechanical engineering

Specialty Materials science

Qualification Doctor of Philosophy Materials science

Kyiv 2021

1. Profile of the educational and scientific program Materials science

1 – General information	
Full name of the institution of higher education and structural unit	Kyiv National University of Technologies and Design Department of Textile Technology and Design
Higher education degree and qualification in the original language	Level of higher education – third (educational and scientific). Higher education degree - Doctor of Philosophy Field of knowledge – 13 Mechanical engineering Specialty – 132 Materials science
Type of diploma and scope of educational program	Doctor of Philosophy, single, 48 ECTS credits
Availability of accreditation	-
Cycle / level	The National Qualifications Framework of Ukraine -the eighth level
Prerequisites	Master's Degree
Language (s) of instruction	Ukrainian
Term of the educational program	-
Internet address of the permanent placement of the description of the educational program	http://knutd.edu.ua/ekts/
2 – The aim of the educational program	
Deepening of theoretical university and professional knowlegies, development of general and professional competencies, which provides training of highly qualified personnel for research and design-analytical activities, of scientifically based consulting in the field of materials science and also teaching. The program is developed in accordance with the mission of the university, aimed at acquiring competencies sufficient to produce new ideas, solving complex problems of research and design activities, mastering the methodology of scientific and pedagogical activities, as well as own research in the field of materials science, the results of which has theoretical and practical significance.	
3 – Characteristics of the educational program	
Subject area	The program is designed as an optimal combination of academic and professional requirements. It is focused on the formation of applicants' competencies for acquiring in-depth knowledge of the specialty, possession of general scientific (philosophical) competencies, acquisition of universal research skills and presentation of their own research results in oral and written form, in particular, in a foreign language. Compulsory subjects - 75%, of which - compulsory subjects of professional training - 44%, general training - 34%, knowledge of a foreign language - 22%; disciplines of free choice of the applicant, which provides professional training - 25%.
Orientation of the educational program	Educational and scientific for training of a doctor of philosophy.
The main focus of the educational program	Accent is made on the formation and development of design and professional competencies in determining and forecasting the relationships between the composition, structure and properties of materials for textile and light industry, taking into account the current state of materials science, which is aimed at obtaining the ability to own methods and techniques of theoretical and practical work.

Peculiarities of the educational program	The program is based on innovative project results and modern scientific research in the field of materials science, application of material properties research for textile and light industry products, creation of a nomenclature of their quality indicators and expert evaluation, focuses on current areas of research, in which the applicant determines a professional and scientific career. The program develops prospects for participation and internships in the structure of research and project foundations both in Ukraine and abroad. Performed in an active research environment, focused on the implementation of the program of international academic mobility of participants of the educational process.	
4 – Suitability of graduates for employment and further study		
Suitability for employment	Obtaining the degree of Doctor of Philosophy expands the prospects of a professional career as a material scientist, as expert in ensuring and determining the quality of materials for textile and light industry products. Applicants are able to work in institutions, universities, companies, research and design institutions, research and production associations, technical institutions, small businesses, research and production associations, customs institutions. Specialists are able to perform professional work as an assistant of the department of higher education, researcher, research engineer, analyst-consultant, head of the structural unit, chief engineer, quality assurance and quality determination expert.	
Further training	Lifelong study to improve professional, scientific and other activities. Opportunity to continue education at the scientific level of higher education (doctor of sciences)	
5 – Teaching and assessment		
Teaching and learning	Student-centered and problem-oriented study, study through scientific and pedagogical practice and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary - active direct participation of research and teaching staff and higher education. Forms of organization of the educational process: lecture, seminar, practical, laboratory classes, practical training, independent work, consultations, development of professional projects (works).	
Assessment	Exams, testing, essays, presentations, reports, design and analytical tasks.	
6 – Program competencies		
Integral competence (IC)	Ability to solve complex problems in the materials science of textile and light industry products in professional and / or research and innovation field , which involves a deep rethinking of existing and the creation of new holistic knowledge and / or professional practice.	
General competencies (**GC)**	GC 1	Ability to abstract thinking, analysis and synthesis.
	GC 2	Ability to develop and manage projects.
	GC 3	Ability to generate new ideas (creativity).
	GC 4	Formation of a systemic scientific worldview, professional ethics and general cultural outlook.
	GC5	Ability to communicate in a foreign language.
	GC 6	Ability to use information and communication technologies.
	GC 7	Ability to work in an international context.

Professional competencies (PC)	PC 1	Ability to carry out scientific and pedagogical activities.
	PC 2	Ability to plan and solve problems of own professional and personal development.
	PC 3	Ability to initiate and perform scientific and project research of production products and light industry technology based on a holistic systemic scientific worldview.
	PC 4	Ability to analytical and experimental scientific and technical activities using effective research methods and tools in light industry products technologies.
	PC 5	Ability to organize and provide a system-structural analysis of research results, providing practical recommendations for the design of light industry products with predictable characteristics.
	PC 6	Ability to navigate in the choice of mathematical apparatus for modeling technological processes of production and making optimal decisions.
	PC 7	Ability to make based decisions.
	PC 8	Ability to communicate effectively with special professional and general audiences.

7 - Program learning results	
Knowledge and understanding:	
PLR 1	Know the structure and functions of modern scientific knowledge and trends in its historical development; global trends in the scientific picture of the world; worldview, methodological and other philosophical foundations of modern scientific knowledge, problems related to the influence of science and technology on the development of modern civilization.
PLR 2	Know the principles of system-structural approach to determining the interaction and forecasting the structure and properties of basic and innovative materials for textile and light industry products for a specific purpose.
Application of knowledge and understanding (skills):	
PLR 3	Demonstrate universal skills of the researcher, in particular oral and written presentation of the results of own research, management of research projects and / or writing proposals for research investigations.
PLR 4	Develop the structure and content of the lesson in accordance with the didactic purpose, plan independent work of students and apply the basic systems of diagnosis and evaluation of learning outcomes, strategies of pedagogical interaction.
PLR 5	Use different strategies of pedagogical interaction, ways of communicative influence, dialogic pedagogical communication, as well as demonstrate leadership and self-regulation skills based on self-knowledge.
PLR 6	Choose methods and technologies for creating of mathematical models and verification of modeling results, methods of optimization and multicriteria optimization, basic algorithms for organizing the analytical process of researching the properties of materials for textile and light industry, creating a range of quality indicators and expert evaluation for optimal decision making.
PLR 7	Use modern standard computer programs and develop own ones to solve problems of modeling, forecasting and interpretation of results.

PLR 8	Use modern information technology for research search, making optimal decisions, registration of research results, automation of the experiment, statistical data processing.
PLR 9	Demonstrate the ability to take responsibility for the results of own professional activities, adhere to professional ethics and corporate culture.
Formation of judgments:	
PLR 10	Demonstrate the ability to communicate in dialogue with the general scientific community and the public in a particular field of scientific and / or professional activities, to present, discuss and defend own views orally and in writing to professional and non-professional audiences.
PLR 11	Find information and discuss in a foreign language environment in solving social and professional problems; be able to translate, abstract and annotate technical texts.
PLR 12	Make a patent search, research and correctly form signs of novelty in the objects under development, apply for inventions and copyrighted works, competently analyze technical and economic solutions in order to determine their protection and patent purity.
PLR 13	Arguedly form the process of determining the properties of specific types of materials taking into account the importance of the main and additional functions of the product, to substantiate the relevance and essence of the concept of confection of materials for the product, to have basic computer technologies of this process.
PLR 14	Qualifiedly reflect the results of scientific research in scientific articles published both in professional domestic publications and in publications that are part of international scientometric databases.

8 – Resource support for the implementation of the program	
Staffing	All scientific and pedagogical teachers, who provide educational and scientific program by qualification, correspond to the profile and direction of the taught disciplines; have the necessary experience of pedagogical and scientific work. Professionals with experience in research / management / innovation / creative work and / or work in the specialty and foreign lecturers are involved in the organization of training.
The material and technical support	The material and technical support allow fully insurance of the educational process throughout the entire training cycle for the educational program. The condition of the premises is certified by sanitary-technical passports, in accordance with the current regulations.
Information and educational-methodical support	The program is fully provided with an educational and methodological complex of all components of the educational program, the availability of which is presented in the modular environment of the educational process of the University.
9 – Academic mobility	
National credit mobility	Provides for the possibility of academic mobility in some components of the educational program, which ensure acquisition of general and/or professional competencies.
International credit mobility	The program develops the prospects for participation and internship in research projects and academic mobility programs abroad. Executed in an active research environment.
Training of foreign applicants for higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

2. List of components of the educational and scientific program of the third (educational and scientific) level of higher education

Code	Components of the educational program (disciplines, semester work, practice)	Amount of credits	Final control form
1	2	3	4
Mandatory components (MC)			
General courses cycle			
CC 1	Philosophy of Science and Research Methodology	4	exam
CC 2	Foreign language for academic purposes	8	pass / exam
CC 3	Information and communication technologies in scientific research	4	pass
CC 4	Intellectual property and commercialization of scientific research	4	pass
Total from the cycle		**20**	
Professional courses cycle			
CC 5	Pedagogical skills in higher education institutions	4	pass
CC 6	Theoretical basics of materials science (textile, leather-fur and footwear)	4	exam
CC 7	Theoretical basics of experimental design and interpretation of results of definition of materials properties	4	exam
CC 8	Pedagogical practice	4	pass
Total from the cycle		**16**	
Total required components		**36**	
Selected components of the educational program			
DSFC	Disciplines of applicant's free choice	12	pass / exam
The total volume of sampled components		**12**	
TOTAL EDUCATIONAL PROFESSIONAL PROGRAM		**48**	

2.1.2 Content of the scientific component of the educational scientific program of the third (educational scientific) level of higher education

Search for scientific sources and their processing. Defining the main tasks of the dissertation. Selection of optimal theoretical and / or experimental methods for their solution. Data mining, processing and analysis of the obtained results. Correction of initial hypotheses and problems in accordance with the results of the analysis. Preparation of scientific results for publication. Approbation of scientific results at scientific conferences of different levels. Generalization of research results. The final definition of the range of problems that will be considered in the dissertation, the establishment of the place of research in the context of the results of other authors. Formation of conclusions and recommendations. Registration of work and submission to the defense. Dissertation defense.

The main scientific results of the dissertation must be covered in at least three scientific publications that reveal the main content of the dissertation. Such scientific publications include:

- at least one article in periodical scientific editions of other states that are members of the Organization for Economic Cooperation and Development and / or the European Union, in the scientific field for which the applicant's dissertation was prepared. Such publication may be equated with publication in editions included in the list of scientific professional editions of Ukraine with the assignment of category "A", or in foreign editions indexed in the databases Web of Science Core Collection and / or Scopus;

- articles in scientific editions included in the list of scientific professional editions of Ukraine with the assignment of category “B” (instead of one article a monograph or a section of a monograph published in co-authorship may be included).

A scientific publication in the edition referred to in the first - third quartiles (Q 1 - Q 3) according to the classification SC Imago Journal and Country Rank or Journal Citation Reports, is equated to two publications, which are credited in accordance with the first point of this paragraph.

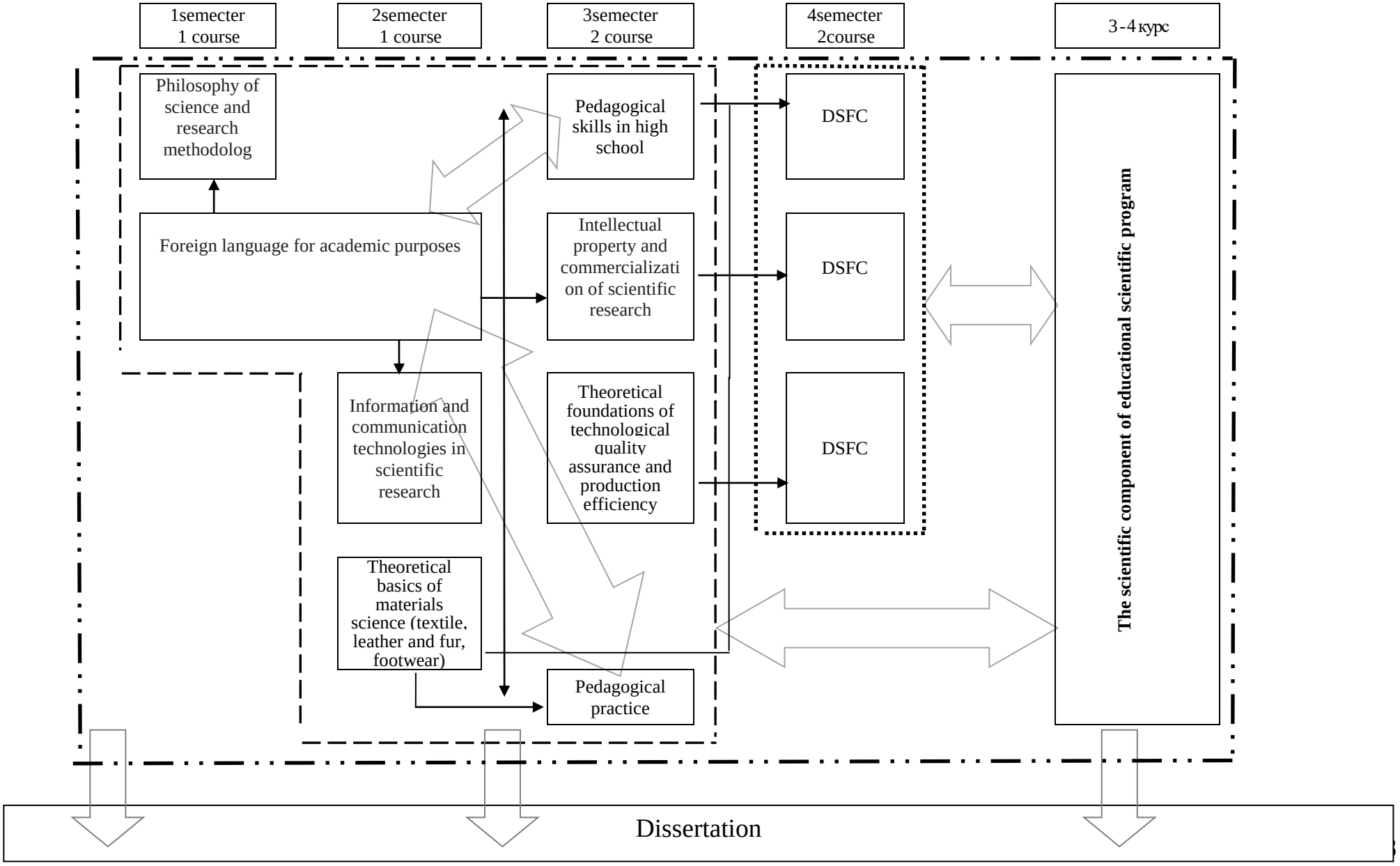
Scientific publications are credited on the topic of the dissertation subject to the following conditions:

- substantiation of the obtained scientific results in accordance with the purpose of the article (task) and conclusions;
- publication of articles in scientific professional editions, which on the date of their publication are included in the list of scientific professional editions of Ukraine, approved in the manner prescribed by law;
- publication of articles in scientific periodicals of other states in the scientific field for which the applicant's dissertation was prepared, provided that the dissertation materials, determined by the council, are complete;
- publication of no more than one article in one issue (issue) of a scientific edition.

3. Certification form of applicants for higher education

Attestation forms of applicants for higher education	Certification of a graduate of an educational scientific program is carried out in the form of public defense of a dissertation for the degree of "Doctor of Philosophy" in the specialty «Materials science».
Document of higher education	Doctor of Philosophy with the qualification of Doctor of Philosophy in Materials science (educational scientific program «Materials science»).

2.2 Structural and logical scheme of preparation of the doctor of philosophy of the educational and scientific program «Materials science»



4. Matrix of correspondence of program competencies

	GC 1	GC 2	GC 3	GC 4	GC 5	GC 6	GC 7	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8
CC1	*	*	*	*			*	*							*
CC2		*			*	*	*								
CC3	*	*	*		*	*	*	*		*	*	*	*		*
CC4	*	*	*	*		*	*	*	*	*				*	
CC5				*		*	*	*	*						*
CC6		*							*	*		*		*	
CC7										*	*	*	*		
CC8				*		*	*	*						*	*

5. Matrix for providing software learning outcomes with relevant components of the educational program

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14
CC1	*							*						*
CC2									*	*				
CC3			*		*	*	*	*			*	*	*	
CC4			*							*			*	
CC5				*	*				*					
CC6		*	*										*	*
CC7						*	*						*	*
CC8				*	*				*					