Ministry of Education and Science of Ukraine
State higher education institution
«Ukrainian State University of Chemical Technology»

Rector of SHEI USUCT
_____K.M. Sukhyy
«____»_____2019

EDUCATION PROFESSIONAL PROGRAM

Jewelry, dental and orthopedic materials science
(Name of the educational program)

The first (bachelor) level
(name of higher education level)

Bachelor
(the name of the degree awarded)

BRANCH OF KNOWLEDGE **13 Mechanical Engineering**
(code and name of the field of knowledge)

SPECIALTY **132 Material Science**
(specialty code and name)

Approved at the meeting of the Academic
Council of the SHEI USUCT
from «_____»_____2019 y.
protocol №____

Dnipro
2019

Letter of approval
EDUCATIONAL PROFESSIONAL PROGRAM

Higher education level	The first (bachelor) level
Branch of knowledge	13 Mechanical Engineering
Specialty	132 Material Science
« AGREED »	« DEVELOPERS » (project team)
First Vice-Rector, Head of Research methodical council SHEI USUCT _____ Zaychuk O.V. (signature) (surname and initials) „_____” _____2019 y.	Project Team Leader _____ Girin O.B. (signature) (surname and initials) „_____” _____2019 y.
	Project team members:
Head of ESC _____ Smotrayev R.V. (signature) (surname and initials) „_____” _____2019 y.	_____ Ovcharenko V.I. (signature) (surname and initials) „_____” _____2019 y.
Educational and Methodical Department _____ Fomenko G.V. (signature) (surname and initials) „_____” _____2019 y.	_____ Trofimenko V.V. (signature) (surname and initials) „_____” _____2019 y.
Dean of the Faculty _____ Nachovnyy I.I. (signature) (surname and initials) „_____” _____2019 y.	
Head of Department _____ Girin O.B. (signature) (surname and initials) „_____” _____2019 y.	
	The educational and professional program was enacted by order of the rector № ___ from „____” _____ 2019 y.

I. PROFILE OF THE BACHELOR EDUCATION PROFESSIONAL PROGRAM

from specialty 132 «Material Science»

Program Profile (General Information)	
Full name of the qualification in the original language	Higher Education Degree - Bachelor Specialty – «Material Science» (name)
The official name of the educational program	Educational-professional program «Jewelry, Dental and Orthopedic Materials Science» preparation of bachelor's degree in specialty 132 «Materials Science»
Type of diploma and scope of the educational program	Bachelor's Degree in Materials Science, single (double, joint with relevant contracts, training programs); 240 ECTS credits based on complete general secondary education; at least 120 ECTS credits based on the Bachelor's Degree (Junior Professional Education)
Full name of higher education institution awarding the qualification	State higher education institution «Ukrainian State University of Chemical Technology»
Accrediting organization	Accreditation Commission of Ukraine («State Educational and Training Center for Educational Quality»). National Agency for Higher Education Quality Assurance.
Accreditation period	Certificate validity after initial accreditation – 5 years, after repeated – 10 years.
Cycle / level	NQF of Ukraine - level 7, QF-EHEA – the first cycle, EQF-LLL – 6 level
Prerequisites	Complete General Secondary Education, Bachelor's Degree (Junior Professional Education)
Language (s) of teaching	Ukrainian language
A	**The purpose of the educational program**
The purpose of the educational program	To provide education in the field of materials science with wide access to employment, to prepare students who aspire to become specialists, capable of effectively performing professional activity, which involves solving complex specialized and practical tasks related to the development, application, production, processing and testing and articles based on jewelry, dental and orthopedic production
B	**Characteristics of the educational program**
Subject area (field of knowledge, specialty)	Knowledge Area 13 - *Mechanical Engineering* specialty 132 - *Materials Science*
The main focus of the program and specialization	General higher education in the field of mechanical engineering.

Orientation of the program	The program is focused on the formation of the widest possible scientific and technical outlook of the future specialist. The program is balanced in terms of social and humanitarian and fundamental training and contains a sufficient sample component by specialization. This gives you the opportunity to gain basic knowledge of fundamental and natural sciences, general and specialized training.
Features and differences	Regular updating to take into account trends in the progressive development of material science.
C	**Ability to find employment and further education**
Employment ability	Bachelors can work in the specialty Material Science.
Further training	Master's degree programs in mechanical engineering.
D	**Teaching style and teaching methodology**
Approaches to teaching and learning	Combination of lectures, practicals and seminars, laboratory classes in computer classes, writing of coursework, self-study, preparation of qualification work.
Assessment methods	Written and oral examinations, tests, presentations, defense of bachelor's qualification work.
E	**Software competencies**
Integrated Competence (INT)	Bachelor's Degree (Level 6): The ability to solve complex specialized problems and practical problems in a particular area of professional activity or in a learning process that involves the application of certain theories and methods of the relevant science and is characterized by the complexity and uncertainty of the conditions
General Competences (GC)	GC.01 - Ability for abstract thinking, analysis and synthesis. GC.02 - Ability to apply knowledge in practical situations. GC.03 - The ability to learn and master modern knowledge GC.04 - Ability to identify, ask and solve problems. GC.05 - Ability to make informed decisions. GC.06 - The ability to adapt and act in a new situation. GC.07 - The ability to use information and communication technologies. GC.08 - Ability to communicate in the official language, both orally and in writing. CC.09 - Ability to communicate in a foreign language. GC.10 - Ability to work autonomously. GC.11 - The ability to work in a team. GC.12 - Aspiration for preservation of environment. GC.13 - The ability to realize their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of man and citizen in Ukraine. GC.14 - Ability to preserve and multiply moral, cultural, scientific

	values and achievements of the society on the basis of understanding of history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, use different types and forms of motor activity for active rest and leading a healthy lifestyle.
Special (professional) competences (SC)	SC.01 - Ability to apply appropriate quantitative mathematical, physical and technical methods and computer software to solve material engineering problems. SC.02 - The ability to ensure the quality of materials and products. SC.03 - Ability to effectively use technical literature and other sources of information in the field of materials science. SC.04 - Ability to work in a team on large engineering projects in the field of materials science. SC.05 - Ability to apply a systematic approach to solving material engineering problems. SC.06 - Ability to use practical engineering skills when solving professional problems. SC.07 - Ability to apply knowledge and understanding of scientific facts, concepts, theories, principles, and methods necessary to support material science activities. SC.07 - Ability to apply knowledge and understanding of the interdisciplinary engineering context and its basic principles in professional activity. SC.09 - Ability to apply modern methods of mathematical and physical modeling, study of structure, physical, mechanical, functional and technological properties of materials to solve material science problems. SC.10 - Ability to apply the skills of testing equipment to solve material problems. SC.11 - Ability to organize work in accordance with the requirements of safety and health. SC.12 - Ability to carry out research in the field of materials science, process and analyze the results of experiments. SC.13 - Ability to take into account social, environmental, ethical, economic and commercial considerations that influence the implementation of technical decisions. SC.14 - Ability to comply with professional and ethical standards.
F	**Program learning outcomes**
Learning outcomes in the cognitive (cognitive) field	LCF.01 - Demonstrate mastery of logic and methodology of scientific knowledge. LCF.02 - Know and be able to use the knowledge of the fundamental sciences that underpin the relevant specialization of materials science at the level necessary to achieve other results of the educational program.

	LCF.03 - To possess the means of modern information and communication technologies in the amount sufficient for training and professional activity. LCF.04 - To convey their knowledge, decisions and the basis for their adoption to specialists and non-specialists in a clear and unambiguous form. LCF.05 - Demonstrate skills in the state language both verbally and in writing. LCF.06 - Demonstrate the ability to communicate in a foreign language. LCF.07 - Have the skills that allow you to continue to learn and acquire modern knowledge. LCF.08 - Know the requirements of industry regulations.
Results of training in the value-motivational sphere	RVMS.01 - Be able to apply their knowledge to solve problems in a new or unfamiliar environment. RVMS.02 - Be able to experiment and analyze data. RVMC.03 - The ability to combine theory and practice to solve an engineering problem. RVMC.04 - Know the engineering disciplines that underpin the specialty at the level required to achieve other program outcomes, including some awareness of their recent achievements.
Learning outcomes in the psychomotor field	LPF.01 - Describe the methods of modifying their properties for the structure of metals, non-metals, composites and functional materials. Qualified to choose materials for various products LPF.02 - Identify environmentally hazardous and harmful occupational factors through preliminary analysis and adjust the content of the activity to prevent negative environmental impacts. LPF.03 - Use experimental methods of structural, physical and mechanical research. Electrophysical, magnetic, optical and technological properties of materials. LPF.04 - Know and apply design principles for new materials. LPF.05 - Know and use the methods of physical and mathematical modeling in the creation of new and improvement of existing materials, technologies for their production LPF.06 - Demonstrate awareness and practical skills in the field of technological support for the manufacture of materials and articles LPF.07 - Be able to identify, formulate and solve material problems according to their specialty; understand the importance of non-technical (society, health and safety, environmental, economic, industrial) restrictions. LPF.08 - Be able to select and apply suitable typical research methods (analytical, computational, modeling, experimental); correctly interpret the results of such studies and draw conclusions. LPF.09 - Be able to search the literature, consult and critically use scientific databases and other relevant sources of information for the purpose of detailed study and research of engineering issues

	according to their specialization. LPF.10 - Demonstrate knowledge of methods and skills of practical application of methods of experimental research of chemical, physical, mechanical, functional and technological properties of materials and articles. LPF.11 - Describe the sequence of preparation and calculate the cost-effectiveness of the production of materials and articles. LPF.12 - Be able to use basic methods of analysis of substances, materials and appropriate processes with correct interpretation of results. LPF.13 - Own and apply product quality systems, methods of ensuring and controlling them. LPF.14 - Knowledge of technical characteristics, operating conditions, use of production equipment for material processing and measuring instruments. LPF.15 - Knowledge of the major groups of materials and the ability to reasonably select them for a particular use. LPF.16 - Knowledge of the basic technologies of production, processing, testing of materials and conditions of their application. LPF.17 - Knowledge of the basics of standardization, certification and accreditation of materials and articles.

I. DEFINITIONS OF EDUCATIONAL DISCIPLINES / MODULES, ensuring the achievement of the planned learning outcomes and forms of certification of higher education applicants in accordance with the higher education standard

Table 1. Distribution of the content of educational and professional program by cycles of preparation and form of final control

№	Subjects	credits	hours	Semester	Tetramester	Final control
	1. A REQUIRED PART					
1.1	***General training cycle*** *(generates competencies)*					
1.1.1	History of Ukraine	3.0	90	1	1	exam.
1.1.2	Ukrainian language (professional)	3.0	90	1	2	exam.
1.1.3	History of Ukrainian Culture	2.0	60	2	4	d.test
1.1.4	Philosophy	5.0	150	5	9,10	exam.
1.1.5	Foreign language (professional)	8.0	240	1,2	1,2,3,4	test,exam.
1.1.6	Physical education (non-credit discipline)			1,2,3,4	1,2,3,4,5,6,7,8	test
1.1.7	Higher mathematics	8.0	2400	1,2	1,2,3,4	exam.
1.1.8	Physics	8.0	2400	2,3	3,4,5,6	exam.
1.1.9	General and inorganic chemistry	10.0	300	1	1,2	exam.
1.1.10	Organic chemistry	6.0	180	2	3,4	exam.
1.1.11	Informatics and information technologies	6.0	180	4	7,8	exam.
1.1.12	Ecology	2.0	60	1	1	test
1.1.13	Introduction to	2.0	60	2	3	test
	TOTAL on cycle 1.1	***63***	***1890***			
1.2	***Training cycle*** (forms special (professional) competences)					
1.2.1	Engineering and computer graphics	4.0	120	1,2	1,2,3,4	test, d.test
1.2.2	Electrical Engineering and Fundamentals of Electronics	3.0	90	4	7	d.test
1.2.3	Theoretical mechanics	3.0	90	4	7	d.test
1.2.4	Strength of Materials	3.0	90	4	8	exam.
1.2.5	Interchangeability and technical measurements (professionally oriented)	5.0	150	7,8	14,15	test, exam.
1.2.6	Metal Science	5.0	150	6	11,12	exam.
1.2.7	Instrumental methods of chemical analysis	4.0	120	5	9,10	d.test
1.2.8	Physical chemistry	2.0	60	5	9	test
1.2.9	Material science of composite and non-metallic materials	4.0	120	6	11,12	test

1.2.10	Analysis and control of materials	7.0	210	6	11,12	exam.
1.2.11	Technologies of structural materials	6.0	180	2	3,4	test
1.2.12	Physico-mechanical, technological and operational properties of materials	7.0	210	3,4	6,7,8	test,exam.
1.2.13	Fundamentals of scientific research and organization of the experiment	3.0	90	8	15	d.test
1.2.14	Economics, organization and management of enterprises	4.0	120	5	9,10	exam.
1.2.15	Basics of labor protection	3.0	90	7	14	exam.
1.2.16	Life Safety	2.0	60	1	2	test
1.2.17	Pre-diploma practice	6.0	180		16	d.test
1.2.18	Preparation of Bachelor's Degree and State Certification	9.0	270		16	
	TOTAL on cycle 1.2	***80.0***	***2400***			
	A MANDATORY PART TOTAL	**143.0**	**4290**			
	2. SELECTIVE PART					
2.1	***General training cycle*** (generates common competencies)					
2.1.1	Mathematical and computer modeling	3.0	90	7	13	test
2.1.2	Medical basics of human health	4.0	120	6	11,12	test
2.1.3	Influence of materials on the human body	4.0	120	8	15	test
2.1.4	Crystallography and mineralogy	4.0	120	3	5,6	test
2.1.5	Standardization and certification of materials	3.0	90	6	11	test
2.1.6	Economic theory	2.0	60	5	10	d.test
2.1.7	science of law	2.0	60	5	10	test
2.1.8	Production automation (professionally oriented)	3.0	90	5	9,10	d.test
2.1.9	Mechanical production equipment (professionally oriented)	4.0	120	7	13	test
	TOTAL on cycle 2.1	***29,0***	***870***			
2.2	***Training cycle*** (forms special (professional) competences)					
2.2.1	Chemical and functional properties of materials	5.0	150	3	5,6	exam.
2.2.2	Crystal Physics and Crystal Chemistry of Materials	7.0	210	3	5,6	exam.
2.2.3	Applied material science	8.0	240	5	9,10	exam.
2.2.4	Technologies of thermal and mechanical processing of materials	8.0	240	3,4	5,6,7	test, d.test
2.2.5	Materials science of coatings and films	4.0	120	7	14,15	test
2.2.6	The latest materials	4.0	120	7,8	14,15	test
2.2.7	Corrosion and protection of materials	6.0	180	4	7,8	d.test
2.2.8	Biocompatible materials	4.0	120	4	8	test
2.2.9	Jewelry materials and technologies for their production and processing	8.0	240	7,8	13,14,15	test, exam.

2.2.10	Dental materials and technologies for their production and processing	7.0	210	6	12	exam.
2.2.11	Orthopedic materials and technologies for their production and processing	7.0	210	7	14	exam.
	TOTAL on cycle 2.2	***68.0***	**2040**			
	SELECTIVE PART TOTAL	**97.0**	**2910**			
	TOTAL VOLUME	**240.0**	**7200**			

Table 2. Generalized content distribution of educational and professional program by component groups (disciplines) and training cycles

№	Preparation cycle	Higher education student load (credits /%)		
		Compulsory Components of the Professional Education Program	Selective Components of the Professional Education Program	For the whole term of study
1.	General training cycle (generates competencies)	63,0 / 26,25	29,0 / 12,08	92,0 / 38,33
2.	Training cycle (forms special (professional) competences)	80,0 / 33,34	68,0 / 28,33	148,0 / 61,67
Total for the whole term of study		143,0 / 59,59	97,0 / 40,41	240 / 100

Table 3. The list of disciplines of the educational and professional training program for first-time (bachelor) level students, the teaching time in ECTS credits by training cycles, and the list of competences and learning outcomes formed

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
1.1. General training cycle (generates competencies)	GC.01, GC.03, GC.08, GC.11, GC.13	LCF.01, LCF.05, LCF.07, LPF.08, LPF.14, LPF.15, RVMS.03	1.1.1. History of Ukraine	3.0
	GC.01, GC.03, GC.08, GC.11, GC.13	LCF.01, LCF.05, LCF.07, LPF.08, LPF.14, LPF.15, RVMS.03	1.1.2. Ukrainian language (professional)	3.0
	GC.01, GC.03, GC.07, GC.08, GC.14, SC.14	LCF.01, LCF.05, LCF.07, LCF.08, LPF.08, LPF.09, LPF.12, LPF.14, LPF.15, LPF.17, RVMS.02, RVMS.03	1.1.3. History of Ukrainian Culture	2.0
	GC.01, GC.03, GC.07, GC.08, GC.14	LCF.01, LCF.07, LPF.08, LPF.14, LPF.15, RVMS.02, RVMS.03	1.1.4. Philosophy	5.0
	GC.01, GC.03, GC.09	LCF.01, LCF.07, LPF.08, LPF.14, LPF.17, RVMS.01	1.1.5. Foreign language (professional)	8.0
			1.1.6. Physical education (non-credit discipline)	
	GC.01, GC.02, GC.03, SC.01, SC.09	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.14, RVMS.01	1.1.7. Higher mathematics	8.0
	GC.01, GC.02, GC.03, SC.01, SC.09	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03,	1.1.8. Physics	8.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
		LPF.05, LPF.06, LPF.08, LPF.14, RVMS.01		
	GC.01, GC.02, GC.03, GC.04, GC.10, GC.11, GC.12, SC.08	LCF.01, LCF.03, LCF.04, LCF.05, LCF.06, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14, LPF.16, LPF.17	1.1.9. General and inorganic chemistry	10.0
	GC.01, GC.02, GC.03, GC.04, GC.10, GC.11, GC.12, SC.08	LCF.01, LCF.03, LCF.04, LCF.05, LCF.06, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14, LPF.16, LPF.17	1.1.10. Organic chemistry	6.0
	GC.01, GC.02, GC.03, GC.07, SC.01, SC.03, SC.09	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.14, LPF.16, RVMS.01, RVMS.02, RVMS.03	1.1.11. Informatics and information technologies	6.0
	GC.01, GC.02, GC.03, GC.04, GC.06, GC.12, SC.11, SC.13	LCF.01, LCF.02, LCF.04, LCF.06, LCF.07, LCF.08, LPF.02, LPF.07, LPF.08, LPF.11, LPF.14, LPF.16, RVMS.02	1.1.12. Ecology	2.0
	GC.01, GC.02, GC.03, GC.04, GC.10, GC.11, SC.03	LCF.01, LCF.03, LCF.04, LCF.05, LCF.08, LPF.08, LPF.14, LPF.16, LPF.17, RVMS.02, RVMS.03	1.1.13. Introduction to	2.0
	GC.01, GC.03, GC.04, GC.07, SC.01, SC.09	LCF.01, LCF.02, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.14, RVMS.01, RVMS.02, RVMS.03	2.1.1. Mathematical and computer modeling	3.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
	GC.01, GC.03, GC.07, GC.14, SC.08	LCF.01, LPF.01, LPF.04, LPF.08, LPF.14	2.1.2. Medical basics of human health	4.0
	GC.01, GC.03, GC.07, GC.14, SC.08	LCF.01, LPF.01, LPF.04, LPF.08, LPF.14,	2.1.3. Influence of materials on the human body	4.0
	GC.01, GC.02, GC.03, SC.08	LCF.01, LCF.04, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14	2.1.4. Crystallography and mineralogy	4.0
	GC.01, GC.02, GC.03, GC.05, SC.02, SC.08, SC.14	LCF.01, LCF.04, LCF.08, LPF.01, LPF.04, LPF.08, LPF.09, LPF.12, LPF.14, LPF.15, LPF.17, RVMS.04	2.1.5. Standardization and certification of materials	3.0
	GC.01, GC.03, GC.14, SC.13	LCF.01, LPF.02, LPF.07, LPF.08, LPF.11, LPF.14	2.1.6. Economic theory	2.0
	GC.01, GC.03, GC.07, GC.11, GC.13, GC.14, SC.13, SC.14	LCF.01, LCF.05, LCF.08, LPF.02, LPF.07, LPF.08, LPF.09, LPF.11, LPF.12, LPF.14, LPF.17, RVMS.02, RVMS.03	2.1.7. science of law	2.0
	GC.01, GC.02, GC.03, GC.04, SC.01, SC.04, SC.05, SC.08, SC.10	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.04, LPF.06, LPF.08, LPF.14, RVMS.01, RVMS.02, RVMS.03	2.1.8. Production automation (professionally oriented)	3.0
	GC.01, GC.02, GC.03, SC.01, SC.04, SC.06, SC.10, SC.11	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.06, LPF.08, LPF.13, LPF.14, RVMS.01, RVMS.02, RVMS.03	2.1.9. Mechanical production equipment (professionally oriented)	4.0
			TOTAL 1.1	**92,0**

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
1.2 Training cycle (forms special (professional) competences)	GC.01, GC.02, GC.03, GC.09, SC.01, SC.04, SC.05, SC.06	LCF.01, LCF.02, LCF.04, LCF.07, LCF.08, LPF.08, LPF.13, LPF.14, RVMS.01, RVMS.02, RVMS.03	1.2.1. Engineering and computer graphics	4.0
	GC.01, GC.02, GC.03, SC.01	LCF.01, LCF.02, LCF.04, LCF.08, LPF.08, LPF.14,	1.2.2. Electrical Engineering and Fundamentals of Electronics	3.0
	GC.01, GC.02, GC.03, GC.04, SC.02, SC.03, SC.05, SC.06, SC.08, SC.09	LCF.01, LCF.04, LPF.01, LPF.03, LPF.04, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.02, RVMS.03, RVMS.04	1.2.3. Theoretical mechanics	3.0
	GC.01, GC.02, GC.03, GC.04, SC.02, SC.03, SC.05, SC.06, SC.08, SC.09	LCF.01, LCF.04, LCF.08, LPF.01, LPF.03, LPF.04, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.02, RVMS.03, RVMS.04	1.2.4. Strength of Materials	3.0
	GC.01, GC.02, GC.03, GC.05, SC.02, SC.08, SC.14	LCF.01, LCF.04, LCF.08, LPF.01, LPF.04, LPF.08, LPF.09, LPF.12, LPF.14, LPF.15, LPF.17, RVMS.04	1.2.5. Interchangeability and technical measurements (professionally oriented)	5.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.06, SC.07	LCF.01, LCF.02, LCF.04, LCF.08, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	1.2.6. Metal Science	5.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
	GC.01, GC.02, GC.03, GC.04, GC.10, GC.11, GC.12, SC.08	LCF.01, LCF.03, LCF.04, LCF.05, LCF.06, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14, LPF.16, LPF.17	1.2.7. Instrumental methods of chemical analysis	4.0
	GC.01, GC.02, GC.03, GC.04, GC.10, GC.11, GC.12, SC.08	LCF.01, LCF.03, LCF.04, LCF.05, LCF.06, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14, LPF.16, LPF.17	1.2.8. Physical chemistry	2.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.06, SC.07	LCF.01, LCF.02, LCF.04, LCF.08, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	1.2.9. Material science of composite and non-metallic materials	4.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.02, SC.09, SC.10, SC.12	LCF.01, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.10, LPF.14, LPF.15, RVMS.04	1.2.10. Analysis and control of materials	7.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.02, SC.03, SC.08	LCF.01, LCF.04, LCF.08, LPF.01, LPF.04, LPF.08, LPF.14, LPF.15, LPF.16, RVMS.02, RVMS.03, RVMS.04	1.2.11. Technologies of structural materials	6.0
	GC.01, GC.02, GC.03, SC.01, SC.02, SC.03, SC.09, SC.10	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	1.2.12. Physico-mechanical, technological and operational properties of materials	7.0
	GC.01, GC.02, GC.03,	LCF.01, LCF.02, LCF.04,	1.2.13. Fundamentals of	3.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
	GC.04, GC.05, GC.07, SC.01, SC.03, SC.05, SC.07, SC.12	LCF.08, LPF.08, LPF.10, LPF.14, LPF.16, RVMS.01, RVMS.02, RVMS.03	scientific research and organization of the experiment	
	GC.01, GC.03, GC.14, SC.13	LCF.01, LPF.02, LPF.07, LPF.08, LPF.11, LPF.14	1.2.14. Economics, organization and management of enterprises	4.0
	GC.01, GC.02, GC.03, GC.04, GC.12, SC.08, SC.11, SC.13	LCF.01, LCF.04, LCF.06, LCF.08, LPF.01, LPF.02, LPF.04, LPF.07, LPF.08, LPF.11, LPF.14, LPF.16	1.2.15. Basics of labor protection	3.0
	GC.01, GC.02, GC.03, GC.04, GC.12, SC.08, SC.11, SC.13	LCF.01, LCF.04, LCF.06, LCF.08, LPF.01, LPF.02, LPF.04, LPF.07, LPF.11, LPF.14, LPF.16	1.2.16. Life Safety	2.0
	GC.01, GC.02, GC.03, GC.09,SC.01, SC.03, SC.04, SC.05, SC.06, SC.07, SC.10, SC.12	LCF.01, LCF.04, LCF.07, LCF.08, LPF.01, LPF.06, LPF.08, LPF.10, LPF.13, LPF.14, LPF.16, RVMS.01, RVMS.02, RVMS.03	1.2.17. Pre-diploma practice	6.0
	GC.01, GC.02, GC.03, GC.09, SC.01, SC.02, SC.03, SC.04, SC.05, SC.06, SC.07, SC.08, SC.11, SC.12, SC.14	LCF.01, LCF.02, LCF.04, LCF.07, LCF.08, LPF.01, LPF.04, LPF.08, LPF.09, LPF.10, LPF.12, LPF.13, LPF.14, LPF.15, LPF.16, LPF.17, RVMS.01, RVMS.02, RVMS.03, RVMS.04	1.2.18. Preparation of Bachelor's Degree and State Certification	9.0
	GC.01, GC.02, GC.03,	LCF.01, LCF.04, LCF.08,	2.2.1. Chemical and functional	5.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
	SC.02, SC.09, SC.10	LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.14, LPF.15, RVMS.04	properties of materials	
	GC.01, GC.02, GC.03, SC.01, SC.07	LCF.01, LCF.02, LCF.04, LCF.08, LPF.08, LPF.14, RVMS.01	2.2.2. Crystal Physics and Crystal Chemistry of Materials	7.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.02, SC.09, SC.10, SC.12	LCF.01, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.10, LPF.14, LPF.15, RVMS.04	2.2.3. Applied material science	8.0
	GC.01, GC.02, GC.03, GC.04, SC.01, SC.02, SC.06, SC.09	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, RVMS.01, RVMS.04	2.2.4. Technologies of thermal and mechanical processing of materials	8.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.06, SC.07	LCF.01, LCF.02, LCF.04, LCF.08, LPF.08, LPF.13, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	2.2.5. Materials science of coatings and films	4.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.06, SC.07, SC.08	LCF.01, LCF.02, LCF.04, LCF.08, LPF.04, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	2.2.6. The latest materials	4.0
	GC.01, GC.02, GC.03, GC.04, GC.05, GC.12, SC.01, SC.02, SC.03,	LCF.01, LCF.02, LCF.04, LCF.06, LCF.08, LPF.01, LPF.03, LPF.04, LPF.05,	2.2.7. Corrosion and protection of materials	6.0

Training cycles	Codes of competences	Codes of learning outcomes	List of subjects	ECTS credits
1	2	3	4	5
	SC.06, SC.08, SC.09	LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04		
	GC.01, GC.03,GC.07, GC.14, SC.08	LCF.01, LPF.01, LPF.04, LPF.08, LPF.14	2.2.8. Biocompatible materials	4.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.04, SC.05, SC.06, SC.07, SC.08, SC.09, SC.10	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.04, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	2.2.9. Jewelry materials and technologies for their production and processing	8.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.04, SC.05, SC.06, SC.07, SC.08, SC.09, SC.10	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.04, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	2.2.10. Dental materials and technologies for their production and processing	7.0
	GC.01, GC.02, GC.03, GC.04, GC.05, SC.01, SC.02, SC.03, SC.04, SC.05, SC.06, SC.07, SC.08, SC.09, SC.10	LCF.01, LCF.02, LCF.04, LCF.08, LPF.01, LPF.03, LPF.04, LPF.05, LPF.06, LPF.08, LPF.13, LPF.14, LPF.15, LPF.16, RVMS.01, RVMS.02, RVMS.03, RVMS.04	2.2.11. Orthopedic materials and technologies for their production and processing	7.0
			TOTAL 1.2	**148,0**
			TOTAL	**240**

Table 4. Matrix of correspondence of program competences to educational components

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8	2.1.9
INT	+																				
GC.01	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC.02						+	+	+	+	+	+	+				+	+			+	+
GC.03	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC.04								+	+		+	+	+							+	
GC.05																	+				
GC.06											+										
GC.07			+	+						+			+	+	+				+		
GC.08	+	+	+	+																	
GC.09					+																
GC.10								+	+			+									
GC.11	+	+						+	+			+							+		
GC.12								+	+		+										
GC.13	+	+																	+		
GC.14			+	+										+	+			+	+		

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8	2.1.9
SC.01						+	+			+			+							+	+
SC.02																	+				
SC.03										+		+									
SC.04																				+	+
SC.05																				+	
SC.06																					+
SC.07																					
SC.08								+	+					+	+	+	+			+	
SC.09						+	+			+			+								
SC.10																					+
SC.11											+										+
SC.12																					
SC.13											+							+	+		
SC.14			+														+		+		

Code of discipline according to the curriculum	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	1.2.16	1.2.17	1.2.18
INT																		
GC.01	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC.02	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
GC.03	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC.04			+	+		+	+	+	+	+	+		+		+	+		
GC.05					+	+			+	+	+		+					
GC.06																		
GC.07													+					
GC.08																		
GC.09	+																+	+
GC.10							+	+										
GC.11							+	+										
GC.12							+	+							+	+		
GC.13																		
GC.14														+				
SC.01	+	+				+			+			+	+				+	+
SC.02			+	+	+	+			+	+	+	+						+
SC.03			+	+		+			+		+	+	+				+	+

SC.04	+																+	+
SC.05	+		+	+									+				+	+
SC.06	+		+	+		+			+								+	+
SC.07						+			+				+				+	+
SC.08			+	+	+		+	+			+				+	+		+
SC.09			+	+						+		+						
SC.10										+		+					+	
SC.11															+	+		+
SC.12										+			+				+	+
SC.13														+	+	+		
SC.14					+													+

Code of discipline according to the curriculum	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11
INT											
GC.01	+	+	+	+	+	+	+	+	+	+	+
GC.02	+	+	+	+	+	+	+		+	+	+
GC.03	+	+	+	+	+	+	+	+	+	+	+
GC.04			+	+	+	+	+		+	+	+
GC.05			+		+	+	+		+	+	+
GC.06											
GC.07								+			
GC.08											
GC.09											
GC.10											
GC.11											
GC.12							+				
GC.13											
GC.14								+			
SC.01		+		+	+	+	+		+	+	+
SC.02	+		+	+	+	+	+		+	+	+

SC.03					+	+	+		+	+	+
SC.04									+	+	+
SC.05									+	+	+
SC.06				+	+	+	+		+	+	+
SC.07		+			+	+			+	+	+
SC.08						+	+	+	+	+	+
SC.09	+		+	+			+		+	+	+
SC.10	+		+						+	+	+
SC.11											
SC.12			+								
SC.13											
SC.14											

Table 5. Software Matrix for Software Learning Outcomes with relevant components Educational and professional program

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8	2.1.9
LCF.01.	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LCF.02.							+	+			+	+		+							+	+
LCF.03.									+	+			+									
LCF.04.							+	+	+	+	+	+	+				+	+			+	+
LCF.05.	+	+	+						+	+			+							+		
LCF.06.									+	+		+										
LCF.07.	+	+	+	+	+							+										
LCF.08.			+				+	+	+	+	+	+	+				+	+		+	+	+
RVMS.01.					+		+	+			+			+							+	+
RVMS.02.			+	+							+	+	+	+						+	+	+
RVMS.03.	+	+	+	+							+		+	+						+	+	+
RVMS.04.																		+				
LPF.01.							+	+	+	+	+			+	+	+	+	+			+	+
LPF.02.												+							+	+		
LPF.03.							+	+			+			+								

LPF.04.									+	+					+	+	+	+			+	
LPF.05.							+	+			+			+								
LPF.06.							+	+			+			+							+	+
LPF.07.												+							+	+		
LPF.08.	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LPF.09.			+															+		+		
LPF.10.																						
LPF.11.												+							+	+		
LPF.12.			+															+		+		
LPF.13.																						+
LPF.14.		+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LPF.15.	+	+	+	+														+				
LPF.16.									+	+	+	+	+									
LPF.17.			+		+				+	+			+					+		+		

Code of discipline according to the curriculum	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	1.2.16	1.2.17	1.2.18
LCF.01.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LCF.02.	+	+				+			+			+	+					+
LCF.03.							+	+										
LCF.04.	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
LCF.05.							+	+										
LCF.06.							+	+							+	+		
LCF.07.	+																+	+
LCF.08.	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+
RVMS.01.	+					+			+			+	+				+	+
RVMS.02.	+		+	+		+			+		+	+	+				+	+
RVMS.03.	+		+	+		+			+		+	+	+				+	+
RVMS.04.			+		+	+			+	+	+	+					+	+
LPF.01.			+	+	+		+	+		+	+	+			+	+		+
LPF.02.														+	+	+		
LPF.03.			+	+						+		+						
LPF.04.			+	+	+		+	+			+				+	+		+
LPF.05.			+	+						+		+						

LPF.06.			+	+						+		+					+	
LPF.07.														+	+	+		
LPF.08.	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+
LPF.09.					+													+
LPF.10.										+			+				+	+
LPF.11.														+	+	+		
LPF.12.					+													+
LPF.13.	+		+	+		+			+								+	+
LPF.14.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LPF.15.			+	+	+	+			+	+	+	+						+
LPF.16.			+	+		+	+	+	+		+	+	+		+	+	+	+
LPF.17.					+		+	+										+

Code of discipline according to the curriculum	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11
LCF.01.	+	+	+	+	+	+	+	+	+	+	+
LCF.02.		+		+	+	+	+		+	+	+
LCF.03.											
LCF.04.	+	+	+	+	+	+	+		+	+	+
LCF.05.											
LCF.06.							+				
LCF.07.											
LCF.08.	+	+	+	+	+	+	+		+	+	+
RVMS.01.		+		+	+	+	+		+	+	+
RVMS.02.					+	+	+		+	+	+
RVMS.03.					+	+	+		+	+	+
RVMS.04.	+		+	+	+	+	+		+	+	+
LPF.01.	+		+	+			+	+	+	+	+
LPF.02.											
LPF.03.	+		+	+			+		+	+	+
LPF.04.						+	+	+	+	+	+
LPF.05.	+		+	+			+		+	+	+
LPF.06.	+		+	+			+		+	+	+

LPF.07.											
LPF.08.	+	+	+	+	+	+	+	+	+	+	+
LPF.09.											
LPF.10.			+								
LPF.11.											
LPF.12.											
LPF.13.				+	+	+	+		+	+	+
LPF.14.	+	+	+	+		+	+	+	+	+	+
LPF.15.	+		+	+	+	+	+		+	+	+
LPF.16.					+	+	+		+	+	+
LPF.17.											

III - FORMS OF CERTIFICATES FOR HIGHER EDUCATION APPLICANTS

Forms of attestation of applicants for higher education	The mandatory form of state certification is the implementation and protection of qualification (diploma) works. The system of competencies and learning outcomes specified in Chapters IV and V. are subject to state certification. The main means of objective control of the degree of achievement of the final goals of education and professional training of bachelors is the technology of performance and protection of qualification (diploma) works, which is defined in the following documents: Regulation on EC, Guidelines for the completion of qualification (diploma) works.
Requirements for final qualification work (in the presence)	Requirements for the final qualification work are set out in the Guidelines for the completion of qualification (diploma) works. The final qualification work is accompanied by the review of the scientific supervisor and the reviewer's review, which are responsible for checking the completeness of the tasks, the quality of the work as a whole and checking it for plagiarism.
Certification / Uniform Qualification Exam Requirements (exams) (in the presence)	
Requirements for public protection (demonstration) (in the presence)	Requirements for public protection are formulated in the EC Regulations and guidelines for the completion of qualification (diploma) works.

IV - Requirements for having an internal quality assurance system for higher education

Determined in accordance with European Standards and Recommendations for Quality Assurance in Higher Education (ESG) and Article 16 of the «Law of Ukraine on Higher Education»

Components of internal quality assurance systems of higher education	**Definitions, references and related documents**
Principles and procedures for quality assurance in education	- Law of Ukraine «On Higher Education» of 01.07.2014 № 1556-VII; - Provisional Regulation on the Organization of the Educational Process at the SHEI USUCT (Order № 290 from 30.11.2015 of the Rector of the SHEI USUCT); - Regulations on diploma with honors of the SHEI USUCT (Order № 55 from 25.02.2016 of the Rector of the SHEI USUCT); - Regulations on the procedure for setting up and organizing the work of the examination commission at the SHEI USUCT (Order № 68 from 01.04.2015 of the Rector); - Regulations on the development of approval and review of work programs of educational disciplines (Order № 291 from 01.12.15 of the Rector of the SHEI USUCT); - Provisional provision on the system of internal quality assurance of the educational activity of the university and the quality of higher education (Order № 52 from 27.02.17 of the Rector of the SHEI USUCT)
Monitoring and periodic review of educational programs	Annual monitoring of requirements of industry and labor market, review of educational programs, work curricula, work programs of educational disciplines. On approval of the composition of the project teams for the development of educational programs (Order№ 74 from 10.03.2016 of the Rector of the SHEI USUCT)
Annual evaluation of higher education applicants	Regulations on the organization of the rectorial control of the quality of training (Order № 78 from 17.03.2014 of the Rector)
Annual evaluation of scientific-pedagogical	Regulations on the commission of the rectorial control of pedagogical skills of the scientific and pedagogical

and pedagogical staff of higher education institution	workers of the University (Order № 85 from 04.04.2016 of the Rector of the SHEI USUCT) amendments to the Order № 147 from 09.06.2011), Procedure for the use of the rating system of evaluation of the departments and departments of the SHEI USUCT (Order № 209 from 04.06.2010 of the Rector). The results of such evaluations shall be regularly published on the official website of the higher education institution, on information stands and in any other way.
Improvement of qualification of scientific-pedagogical, pedagogical and scientific workers	Improvement of qualification of scientific and pedagogical staff is carried out in accordance with the provision approved by the order № 48 from 24.01.2013 of the Ministry of Education and Science of Ukraine. and the Regulations on professional development and training of pedagogical and scientific-pedagogical employees of the SHEI USUCT.
Availability of necessary resources to organize the educational process	Educational and methodological, logistical and personnel support of the licensed conditions (Resolution № 1187 from 30.12.2015 of the CM) of educational activity. Certificates in areas of training and specialties.
Availability of information systems for effective management of the educational process	The Temporary Provision on the Organization of the Educational Process in the SHEI USUCT (Order № 290 from 30.11.2015 of the Rector of the SHEI USUCT) is supported by the Information-analytical system of control of the educational process, which consists of subsystems: Entrant, Educational process.
Publicity of information on educational programs, degrees of higher education and qualification	Information on educational programs, higher education degrees and qualifications is public and fully available on the University's official website: https://udhtu.edu.ua/
Preventing and detecting academic plagiarism	Verification of completeness of tasks, quality of work as a whole and its verification for plagiarism is carried out by the teacher - the leader of coursework or diploma work (project) in the established order using the appropriate software.