



**MINISTRY OF EDUCATION AND SCIENCE OF THE
REPUBLIC OF KAZAKHSTAN**

**ABAY KAZAKH NATIONAL PEDAGOGICAL
UNIVERSITY**

Approved

At the meeting of the Scientific
and methodological Council of
KazNPU. Abai's
Chairman RMC

Rector _____ T. Balykbayev

Protocol № ____ от «__» ____ 2019y

CATALOGUE OF ELECTIVE DISCIPLINES

**Specialty 7M015-Master of education in educational programs for training teachers in
natural science subjects (Chemistry)**

2019/2020 school year

**INSTITUTE OF NATURAL SCIENCE AND GEOGRAPHY
DEPARTMENT OF CHEMISTRY**

Almaty, 2019

CATALOGUE OF ELECTIVE DISCIPLINES
MASTER'S LEVEL

Cycle of disciplines	Name of disciplines and their main sections	(ECTS)
CD	CYCLE OF CORE DISCIPLINES(CD)	35
HSC	HIGH SCHOOL COMPONENT (HSC)	20
1	History and philosophy of science	4
	Philosophy of science. Science in culture, civilization. The emergence, development of science. The structure of scientific knowledge. Scientific revolution. Scientific rationality. Features of modern science. Science as a social Institute of Natural Sciences. History of social Sciences and Humanities. Organization of scientific activities.	
2	Foreign language (professional)	4
	Learning a foreign language at the level of C1, C2 (language specialties), LSP communication in monologue and dialogical form (report, presentation, conversation, discussion). Studying the grammar of scientific style in oral, written forms. Listening information and professional messages. Writing, design of scientific articles, projects, etc.	
3	Pedagogics of the higher school	4
	Pedagogy as a science. The main categories of pedagogy. Subject and tasks of pedagogy. System of pedagogical sciences. Relationship of pedagogy with other sciences. The modern paradigm of higher education. Methodology of pedagogy. Professional competence, the theory of teaching a university teacher. Credit technology training. Organization of CPM, NIRM.	
4	Psychology of management	
	Introduces the problems of management from the perspective of psychological science, likewise General ideas about the socio-psychological patterns of management. The subject of "psychology of management" are the psychological aspects of management relations, functioning in the process of interpersonal and intergroup interaction of people in the process of work	4
EC 1.2	ELECTIVE COMPONENT (TE)	15
1	Active methods of teaching chemistry	5
	Active and interactive teaching methods. History of the use of games and modeling. Imitation games. The essence of gaming activities. Classification of games and modeling. The unity of the theory and practice of games. Psychological and pedagogical principles of game learning. The technology of creating the game.	
2	Methods of solving tasks in the course of chemistry at higher education	5

	Basic concepts of chemistry. Basic units of the International system of units of physical units (SI). Methodical instructions on the correct application of names, designations and definitions of physical quantities and their units in chemistry. Methods of solving problems by formulas.	
3	Organization, planning and execution of research Basic concepts of chemistry. Basic units of the International system of units of physical units (SI). Methodical instructions on the correct application of names, designations and definitions of physical quantities and their units in chemistry. Methods of solving problems by formulas.	5
MD	CYCLE OF MAJOR DISCIPLINES (MD)	49
HSC	HIGH SCHOOL COMPONENT (HSC)	20
1	Modern technology and method teaching of general and inorganic chemistry The study of the main directions of improvement of chemical education in the course of innovative transformations of the entire education system of the Republic of Kazakhstan. Content of general and inorganic chemistry courses in universities. Modern methodological techniques for the formation of the goals and objectives of teaching inorganic chemistry.	5
2	Scientific methodic bases of chemistry organic and high molecular compounds Methodological basis of the study course. Organic chemistry in high school and postgraduate education. Modern learning technologies. The course of organic chemistry in high school. Modern technologies of teaching organic chemistry. Features of teaching chemistry of the Navy. System-structural approach in the study of the chemistry of the Navy.	5
FOCh	МОДУЛЬ2 Fundamentals of Chemistry	
1	Современные методологические основы преподавания физической и коллоидной химии Modern technologies of teaching physical chemistry Statistical thermodynamics. Catalytic processes. Kinetics of chemical reactions. Basic concepts of catalysis. Dispersed systems classification. Scientific and methodological approaches to the study of the physical chemistry of surface phenomena. Features of enzymatic catalysis. Prospects for the production and use of biocatalysts.	5
2	Modern analytical chemistry Analytical chemistry and its content. Important stages in the development of analytical chemistry. Chemical equilibrium Chemical equilibrium constant. Types of equilibrium constants: thermodynamic, concentration, conditional, mixed constants. Their relationship and factors affecting the value of each of them. Theories of acids and bases. Arrhenius theory, Lewis theory, Bronsted theory, Usanovich theory.	5
TE	ELECTIVE COMPONENT (TE)	
ACh	МОДУЛЬ1 Applied chemistry	
1	Applied bases of modern organic chemistry Introduction. Modern Organic Chemistry. Mechanisms of reactions, reactions, reactions. Factors that determine the reactivity of molecules. Modern methods of aliphatic substrates activation. Methods of reactions in organic chemistry. The effect of the solvent nature in organic synthesis. Asymmetric synthesis and connection stereochemistry. Synthesis of complex polyfunctional and polycyclic molecules.	4
2	Chemical Metrology and Chemometrics Basic metrological concepts and their characteristics. Subject	4

	chemometrics. The main goal of the methods developed by chemometrics. Basics of experiment planning. Random variables The laws of the distribution of random variables. Normal distribution of random variables. Verification of data submission to the normal distribution law.	
3	Computer technology in study process Formation of the basics of knowledge about the structure of matter, modeling of molecules of organic and high molecular compounds, as well as the development of the theory of computer modeling and prediction of the physical properties of polymers and organic liquids.	4
4	МОДУЛЬ2 Modern aspects of chemistry Modern methods of environmental analysis Modern methods of environmental analysis	4
5	Chemistry of nanomaterials Basic concepts of the chemistry of nanomaterials. The position of the chemistry of nanomaterials in a number of other sciences. General concepts of the chemistry of nanomaterials as a related science, including the concepts of colloid chemistry, physical chemistry, electrochemistry, as well as the fundamentals of physical methods.	4