«ALIKHAN BOKEIKHAN UNIVERSITY»
Faculty of Information technology and economy
Department of information technology sciences

THE CATALOGUE OF ELECTIVE SUBJECTS

8D06110 COMPUTER SCIENCE

year of entry - 2023

Semey, 2023

Considered and approved at the meeting of educational-methodic Council of the faculty
Minutes № 5 from 15.05.23.

The head of EMC of the faculty _____ (Shoibakova E.O.)

Approved at the meeting of EMC of the University
Minutes №5 from 25.05.23

The chairman of EMC of the University _____ (Zharykbasova K.S.)

Group of education: D094-Information technology

№	Name of the discipline	Number of loans	Prerequisites	Postrequisites	Short description of the aims of education, expected results (knowledge, abilities, skills, competencies)
Basic disciplines				
Elective courses (EC)				
1	Methods of data mining	5	Software Development Technology	Scientific research work of the doctoral student	**Short maintenance of discipline:** Formation of an idea of the types of tasks arising in the field of data mining and methods of their solution, which will help the doctoral student to identify, formalize and successfully solve practical problems of data analysis arising in the course of their professional activities. Empirical hypothesis. Strengthening empirical hypotheses. Theory of measurements. Measures of proximity in the space of different types of features. Classification of data analysis tasks. Basic hypotheses. Statistical formulation of the problem of pattern recognition. Bayesian decision rule. Parametric and nonparametric approaches to recognition. Heuristic pattern recognition algorithms. **Expected result:** know: the main tasks and methods of data mining; owns a culture of thinking, is capable of generalizing, analyzing, perceiving information, setting goals and choosing ways to achieve it; be able to: formulate the tasks of data analysis, select adequate algorithms for their solution, and evaluate the quality of the solutions obtained. Possesses the skills in the process of professional activity to identify the emerging problems of data analysis, knows how to formalize them and determine the most appropriate methods for their solution. **Competencies:** Professional and activity competence, Competence to solve scientific problems
1	Modern concept building systems	5	Software Development Technology	Scientific research work of the doctoral student	**Short maintenance of discipline:** Modeling Language (UML) визуалды модельдеудің бірегей тілі. Mastering the skills of information systems development by doctoral students, the methodology of IP development in application to economic and business –

					oriented IS. Software lifecycle. Methodological aspects of information systems design. Requirements management process. General principles of IP design. Unified Visual Modeling Language Unified Modeling Language (UML). **Expected result:** know: the basics of information systems; formal models of systems; model of subject areas of information systems; methods of analysis and synthesis of information systems; business process models; object-oriented approach; analysis of information system structures; mechanisms of system integration. be able to: develop models of subject areas; conduct research on the characteristics of components and information systems in general; to apply in practice methods and means of designing information systems; assess the quality of the project information systems; to control the development of project documentation. own skills: the analysis of information systems; development of mathematical models of information systems; formation and registration of specifications of requirements in conditions of flexible programming technologies. be competent in organizing and conducting analysis and synthesis of information systems. **Competencies:** Professional and activity competence, Competence to solve scientific problems
Main disciplines					
Elective courses (EC)					
1	Analysis and risk assessment in the management of information security	5	The study and analysis of algorithms	Scientific research work of the doctoral student	**Short maintenance of discipline:** The study of methods and means of information security management (is) in the organization, as well as the study of basic approaches to the development, implementation, operation, analysis, maintenance and improvement of information security management systems of a particular object. Control systems of IB. Basic issues of is management. Standardization in the field of is management. Fundamentals of risk management and information security. Organization of work of security service of the enterprise.

					Expected result: know: modern approaches to the management of information security and the directions of their development; the main standards governing IS management; principles of ISMS construction; the principles of developing IS management processes; be able to: analyze the current state of information security in the enterprise in order to develop requirements for the development of IS management processes; To determine the goals and tasks solved by the developed IS management processes; apply a process approach to the management of information security in various fields of activity; Own: skills management information security of simple objects **Competencies:** Professional, scientific and pedagogical, research, project planning and management
1	Parallel programming with CUDA	5	The study and analysis of algorithms	Scientific research work of the doctoral student	**Short maintenance of discipline:** Providing knowledge features of working with CUDA technology and ways to optimize programs. The basics of the programming model of CUDA. CUDA libraries. Multi-core systems. Types of GPU memory and methods of efficient use of shared memory on the example of some computational algorithms. The use of GPU computing. Elements of professional development - tools for analysis, debugging and diagnostics. Methods for managing multiple GPUs on workstations and distributed cluster systems. Application of CUDA in problems of mathematical modeling of hydrodynamic processes and computer graphics. **Expected result:** In studying the course, doctoral students should: Know: using a video card for non-graphical computing in scientific work. Be able to: create parallel programs for computing systems with distributed, shared memory; Parallelize the computational algorithms; master the skills: in building parallel analogs of computational algorithms; be competent: in formulating the main problems of the subject area, apply universal methods and tools for their solution; the ability to develop algorithms, computational models and

					data models for the implementation of the functionality of information systems and software. **Competencies:** Professional, scientific and pedagogical, research, project planning and management

LIST OF COMPONENTS BY CHOICE
for an educational program
8D06110– «Computer science»

Studying form: Full-time
Studying term: 3 years

Year of entry - 2023

Name of the discipline	Code of discipline	Number of loans	Semester
Base disciplines			
Component on a choice 1			
Data mining methods	MDM7204	5	1
Modern concept building systems	MCBS7204	5	
Main disciplines			
Component on a choice 5			
Analysis and risk assessment in the management of information security	ARAMIS7303	5	2
Parallel programming with CUDA	PPC7303	5	