

Kazakh Humanitarian-Juridical Innovative University
Faculty of Information technology and economy
Department of Information Technology Sciences

8D061 COMPUTER SCIENCE

**THE CATALOGUE OF ELECTIVE
SUBJECTS**

Scientific and pedagogical directions

year of entry - 2021

Semey, 2021

Developed by the Department of Information Technology Sciences

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Minutes № 5 from «13» 05 2021 y.

The head of Philology department *Aukenov* (Aukenov B.M.)

Considered and approved at the meeting of educational-methodic Council of the faculty

Minutes № 5 from «13» 05 2021 y.

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

Approved at the meeting of EMC of the University

Minutes № 5 from «28» 05 2021 y.

The chairman of EMC of the University *Zharykbasova* Zharykbasova K.S.

Adviser *Mengaliev* (Mengaliev D.M.)



**Academic degree: doctor of philosophy PhD
in educational program: 8D061 –Informatics**

Group of education: D094-Information technology

№	Name of the discipline	Number of loans	Prerequisites	Postrequisites	Short description of the content, the aims of education, expected results (knowledge, abilities, skills, competencies)
Basic disciplines					
Elective courses (EC)					
1	Data mining methods	5	Software Development Technology	Neural network, The course of the foreign consultant "IT management services and content"	<p>Aims of study of discipline: Formation of an idea of the types of problems arising in the field of data mining and methods of solving them that will help the doctoral candidate to identify, formalize and successfully solve the practical problems of data analysis arising in the course of their professional activities</p> <p>Short maintenance of discipline: The empirical hypothesis. Strengthening of empirical hypotheses. The theory of measurements. Measures of proximity in space of different types. 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 algorithms for pattern recognition. Statistical and combinatorial statements of the taxonomy problem. Basic algorithms for solving the taxonomy problem. Choice of a system of informative signs. Tasks of a combined type. The problem of natural classification. Technologies for comparing data analysis algorithms for specific tasks and series of tasks.</p> <p>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</p>

					for their solution.
1	Modern concept building systems	5	Software Development Technology	Neural computations and their application, The theory of digital signal processing and pattern recognition	<p>Aims of study of discipline: to familiarize with approaches to the development of information systems, the sequence of the transition from the conceptual model in the development of an information system to a detailed description of the system being developed, the methodology of developing information systems in an application to economic and business-oriented information systems, using flexible software development methodologies, the fundamentals of the development of interfaces, including speech, for information systems.</p> <p>Short maintenance of discipline: The concept of information system (IS). The life cycle of software. Methodical aspects of designing information systems. The process of requirements management. General principles of IS design. Unified Modeling Language Unified Modeling Language (UML)</p> <p>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.</p>
Main disciplines					
Elective courses (EC)					
2	Knowledge	5	Research work	Software	The purpose of the course: To give a

	representation languages		of a doctoral student	Development Technology	<p>general idea of modern representation languages; to show various ways of writing operators that ensure the implementation of any algorithm (following, fork, repetition); to instill practical skills for the implementation of tasks in this subject area</p> <p>Contents: Basics of programming in Java. Operators. Overview of operators. Application of operators and functions of systems. Representation of functions. Overview of transcendental functions (methods). Exponential functions. Arrays. Array declaration. Multidimensional arrays Programming I/O using files. Working with strings. Using Arrays</p> <p>Expected result: Development of professional skills of working with and without classes; ability to program input-output using files. File class. Stream and data File Reader and File Writer. Opening, closing files, functions of working with files. Creating Windows applications; the ability to use a Method Declaration. Application of the constructor. working with Input Stream and Output Stream from packaging java.io . File Input Stream and File Output Stream.</p>
2	Knowledge representation and artificial intelligence systems	5	Modern concept of building systems	Research work of a doctoral student	<p>The purpose of the course: knowledge representation models, theoretical foundations, methods and means of building artificial intelligence systems based on knowledge of global trends in the development of computing and information technology. knowledge representation models, theoretical foundations, methods and means of building artificial intelligence systems based on knowledge of global trends in the development of computing and information technology. ways to formalize intellectual tasks using artificial intelligence languages. The student must show the ability to analyze professional information, highlight the main thing in it, structure and formalize. Mastering knowledge management methods, methods of solving planning problems in intelligent systems, methods of scientific research.</p> <p>Contents: basic models of knowledge</p>

				<p>representation and methods of their processing: logical model, production model, frames, semantic networks; fundamentals of organization, construction and use of expert systems; methods of finding solutions in the state space; methods of planning actions in artificial intelligence systems. The laboratory workshop focused on the study of methods of knowledge representation and output in frame production systems, the development of methods of output management in expert systems, the development of an expert system based on production knowledge, the study and implementation of search in the state space, action planning models in artificial intelligence systems.</p> <p>Expected result: He is able to develop original algorithms and software tools, including using modern intelligent technologies, to solve professional problems. Know modern intelligent technologies for solving professional tasks; Be able to justify the choice of modern intelligent technologies and software environment when developing original software tools for solving professional tasks. Have the skills to develop original software tools, including using modern intelligent technologies, to solve professional problems.</p>
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**LIST OF COMPONENTS BY CHOICE
for an educational program
8D061– «Computer science»**

Studying term: Full-time 3 years

Group of education: D094-Information technology

Name of the discipline	Code of discipline	Number of loans	Semester
Base disciplines			
Component on a choice 1			
Methods of data mining	MDM7203	5	1
Modern concept building systems	MCBS7203	5	
Main disciplines			
Component on a choice 1			
Languages of knowledge representation	LKR7302	5	2
Knowledge representation and artificial intelligence systems	KRAIS7203	5	