

**KAZAKHSTAN REPUBLIC MINISTRY OF EDUCATION AND SCIENCE
SATPAYEV UNIVERSITY**

**MODEL OF SPECIALIST
6B06102 – Computer Science**

Degree of educational program: Bachelor of techniques and technology

Almaty 2021

The present educational program «Computer Science» developed based on the main regulatory documents:

- State compulsory standard of technical and professional education, approved by the government of the Republic of Kazakhstan dated August 23, 2012 No. 1080 (with changes as of 15.08.2017). Footnote. Item 1 as amended by the resolutions Of the Government of the Republic of Kazakhstan No. 327 dated 25.04.2015 (put in force since 01.09.2016); from 13.05.2016 No. 292 (put in force since 01.09.2017). Footnote. Appendix 4 - as amended by order of the Minister of Education and Science of the Republic of Kazakhstan dated 05.05.2020 No. 182.
- Industry qualification framework (IQF). Industry: information and communication technologies. Approved by the minutes No. 1 dated 20 December 2016 meeting of the Sectoral Commission in the sphere of information, Informatization, communications and telecommunications.
- Law of the Republic of Kazakhstan "on education" No. 319-III of July 27, 2007;
- IEEE SWEBOK combining knowledge of software engineering;
- CC2005 guidelines for developing training programs for IT professionals;
- SE2004 educational guide for training specialists of University programs in the field of software engineering.

The Bachelor of Techniques and Technology is awarded to those students who successfully complete the course of the Baccalaureate on the educational program “Computer Science”.

Objects of professional activity:

- Computers, complexes, systems and networks;
- Computer systems for information processing and management;
- Automatic control system;
- Software for computer equipment; information systems (programs, software complexes and systems).

1 Competencies of Bachelor graduates

| Code | Type of competence | Description of competence | The result of the competence | Responsible |
|---|---|---|---|---|
| COMMON (Implies full training with possible additional training depending on the level of knowledge) | | | | |
| G1 | Communicativeness | <ul style="list-style-type: none"> - Fluent monolingual oral, written and communication skills - Ability to communicate fluently in a second language - Ability to use communicative communication in various situations - there are basics of academic writing in your native language - diagnostic test for language level | <p>Full 4-year training with a minimum of 240 academic credits (including 120 contact classroom academic credits) with possible translation of credits into a second language, where students have an advanced level.</p> <p>The language level is determined by passing a diagnostic test.</p> | Department of Kazakh and Russian languages, Department of English |
| G2 | Mathematical literacy | <ul style="list-style-type: none"> - Basic mathematical thinking at the communication level - ability to solve situational problems based on the mathematical apparatus of algebra and the principles of mathematical analysis - diagnostic test for mathematical literacy in algebra | <p>Full 4-year training with a minimum of 240 academic credits (including 120 contact classroom academic credits). If the diagnostic test is positive, the level of mathematics is 1, if it is negative, the level of algebra and the beginning of the analysis</p> | Department of Mathematics |
| G3 | Basic literacy in the natural science disciplines | <ul style="list-style-type: none"> - basic understanding of the scientific picture of the world with an understanding of the essence of the basic laws of science - understanding basic hypotheses, laws, and methods, drawing conclusions, and evaluating errors | <p>Full 4-year training with a minimum of 240 academic credits (including 120 contact classroom academic credits). If the diagnostic test is positive, the level of Physics 1, General chemistry, if negative-the level of the Beginning of physics and Basic of chemistry</p> | Departments in the areas of natural Sciences |
| SPECIFIC (it implies reduced training due to credit transfer depending on the level of knowledge on competencies for graduates of 12-year schools, colleges, universities, including humanitarian and economic areas) | | | | |

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| S1 | Communicativeness | <ul style="list-style-type: none"> - Fluent bilingual oral, written and communication skills - ability to communicate fluently with a third language - writing skills of various styles and genres - skills of deep understanding and interpretation of your own work of a certain level of complexity (essay) - basic aesthetic and theoretical literacy as a condition for full-fledged perception and interpretation of the original text | Full credit transfer by language (Kazakh and Russian) | Department of Kazakh and Russian language |
| S2 | Mathematical literacy | <ul style="list-style-type: none"> - Special mathematical thinking using induction and deduction, generalization and concretization, analysis and synthesis, classification and systematization, abstraction and analogy - ability to formulate, justify and prove statements - Application of General mathematical concepts, formulas, and extended spatial perception of mathematical problems - complete understanding of the basics of mathematical analysis | Transfer of credits in the discipline of Mathematics (Calculus) I | Department of Mathematics |
| S3 | Special literacy in natural Sciences (Physics, Chemistry, Biology, and Geography) | <ul style="list-style-type: none"> - Broad scientific perception of the world, which implies an understanding of natural phenomena | Transfer of credits in Physics I, General chemistry, General biology, Introduction to Geology, Introduction to | Departments in the areas of natural Sciences |

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| | | <ul style="list-style-type: none"> - critical perception for understanding the phenomena of the surrounding world - cognitive abilities to formulate a scientific understanding of the forms of existence of matter, its interaction with nature | geodesy; Training practice, etc. | |
| S4 | English language | <ul style="list-style-type: none"> - readiness for further self-study in English in various fields - readiness to gain experience in project and research work using English | Transfer of English language credits from academic to professional level (up to 15 credits) | Department of English |
| S5 | Computer skills | <ul style="list-style-type: none"> - Basic programming skills in one modern language - using software and applications for teaching various disciplines | Credit transfer for the discipline Introduction to information and communication technologies, Information and communication technologies | Software Engineering Department |
| S6 | Social and humanitarian competencies and behavior | <ul style="list-style-type: none"> - understanding and awareness of the responsibility of each citizen for the development of the country and the world - ability to discuss ethical and moral aspects in society, culture, and science | Transfer of credits in the Modern History of Kazakhstan (except for the state exam) | Department of social Sciences |
| | | <ul style="list-style-type: none"> - critical understanding and the ability to debate for debates on contemporary scientific hypotheses and theories | Transfer of credits in philosophy and other Humanities | |
| PROFESSIONAL (means reduced training due to the transfer of credits depending on the level of knowledge on competencies for graduates of colleges, secondary schools, universities) | | | | |
| P1 | Professional competence | <ul style="list-style-type: none"> -critical perception and deep understanding of professional competencies at level 5 or 6 | Transfer of credits in basic professional disciplines, including introduction to the specialty, engineering ethics, technology of | Software Engineering Department |

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| | | - ability to discuss and debate on professional issues in a learned programme | robotic production, technological objects of automation, theoretical foundations of electrical engineering, technical and logical measurements and devices, mathematical foundations of control theory, electronic devices of automation. | |
| P2 | General engineering competencies | - basic General engineering skills and knowledge, ability to solve General engineering tasks and problems - be able to use application packages for processing experimental data, solving systems of algebraic and differential equations | Credit transfer in General engineering disciplines (engineering graphics, descriptive geometry, basics of electrical engineering, basics of microelectronics.) | Software Engineering Department |
| P3 | Engineering and computer competence | - basic skills of using computer programs and software systems for solving General engineering tasks | Transfer of credits in the discipline of computer graphics, computer modeling and programming in the MatLab environment. | Software Engineering Department |
| P4 | Socio-economic competence | - critical understanding and cognitive ability to reason on contemporary social and economic issues - basic understanding of the economic evaluation of the study objects and the profitability of projects. | Transfer of credits in social-humanitarian and technical-economic disciplines to the credit of the elective cycle | Software Engineering Department |

2 Characteristics of the professional activities of the graduate

Undergraduates in Educational Program 6B06102 – “Computer Science” have competences in the following fields:

knowledge:

- program in modern algorithmic languages, understand the fundamental principles of software development; own different approaches in programming methodology, know the paradigms of modular and object-oriented programming;
- use the basic concepts and methods of discrete mathematics, the basics of mathematical logic, methods of probability theory and mathematical statistics in the study of mathematical models of the subject area; establish links between different mathematical theories to develop integrated methods used to build mathematical models of the subject area;
- use methods for constructing various models of data types, information processing algorithms; it is rational to use the opportunities provided by the algorithmizing technique for solving practical problems;
- use the basic structures and mechanisms of various operating systems, work with modern operating systems. apply the basic concepts of system programming, develop programs that cover system programming issues.

practical knowledge:

- use a unified modeling language, establish architectures and key points of distributed client-server applications, apply networking technologies for communication systems, create networking applications for tools, implement a structural and object-oriented approach in working with tools;
- use tools for deploying and monitoring loosely coupled computing systems, use a basic set of microservices development tools.

ability:

- analyze the subject area and coordinate the requirements for the project with the customer; extract information processes from business processes and model them for domain;
- formulate technical requirements considering the functions performed by computing systems; justify the architecture; define tools for evaluating system performance;
- design an information model of the subject area; install, configure, use and interact with a relational database management system.

4 List of positions for graduates

- Software developer;
- Specialist in computer system maintenance;
- Mobile application developer;
- Web application developer;
- IT engineer or server hardware specialist;
- IT systems manager;
- System administrator;
- Information system architects;
- Data scientist;
- Business analyst.