MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
SATBAYEV UNIVERSITY

GRADUATE PROFILE

6B06102 – Computer Science

Degree of the educational program: Bachelor of Information and Communication Technologies

Almaty 2024

The primary focus of the bachelor's program is on comprehensive training of specialists in the field of computer science, with an emphasis on software development technologies, data analysis, and information systems management. The program aims to prepare qualified IT specialists capable of effectively solving tasks related to software product development, data analysis, and ensuring information security. Graduates will be able to work in industry, business, or governmental organizations, possessing teamwork and critical thinking skills.

The educational program is developed in line with current IT industry requirements and trends in software engineering and data science. It is based on practice-oriented learning, closely connected with employer demands and modern standards in the field of information and communication technologies.

This educational program "6B06102 – Computer Science" is developed in accordance with the State Compulsory Standards of Higher and Postgraduate Education, approved by the order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, No. 2 (registered in the Register of State Registration of Normative Legal Acts under No. 28916). It reflects the learning outcomes, based on which curricula (work curricula, individual student curricula) and work programs for courses (syllabi) are developed.

Objects of professional activity:
- Software and hardware systems.
- Computer networks and systems.
- Databases and data management systems.
- Web applications and mobile applications.
- Artificial intelligence and machine learning systems.

Key competency requirements for graduates in information and communication technologies, graduates must:

1) Understand:
– Modern trends in information technology and software.
– The principles of operating systems, computer networks, and databases.
– Data analysis and machine learning methods and algorithms.
– Key concepts of information security and data protection.
– The role of information technology in solving applied problems across various industries.

2) Know:
– Programming languages (Python, Java, C++) and their application in software development.

– The basics of algorithms, data structures, and object-oriented programming.

– The principles of database design and administration.

– Methods of developing web and mobile applications.

– The basics of information security, including data protection methods.

– Models and methods of big data analysis and machine learning.

3) Be able to:

– Develop and test software products for various platforms.

– Design databases and manage them using SQL and other languages.

– Apply data analysis and machine learning methods to solve applied problems.

– Develop web and mobile applications using modern frameworks.

– Configure and administer operating systems and computer networks.

– Ensure the security of information systems, preventing cyberattacks.

– Work effectively in a team, solve problems, and interact with clients.

4) Have skills in:

– Programming in modern languages and developing algorithms.

– Analyzing and interpreting large data sets using appropriate tools.

– Designing application architectures and developing user interfaces.

– Administering computer systems and networks, including configuring security.

– Evaluating software efficiency and conducting testing.

– Managing IT projects and supporting software products.

B – Basic knowledge, skills, and abilities:

B1 – Knowledge of programming languages (Python, Java, C++) and basic algorithms.

B2 – Mastery of object-oriented programming methods and software development.

B3 – Understanding the architecture of computing systems and operating systems.

B4 – Knowledge of database fundamentals, ability to design and manage databases using SQL.

B5 – Basics of information security and data protection methods.

B6 – Methods of system and structural analysis.

B7 – The software life cycle.

B8 – UML as a basic tool for describing technical systems.

B9 – Process design methods.

B10 – Methods and models of scientific activity.

B11 – Data processing models.

B12 – Basic approaches, tools, and models for project management.

B13 – Analysis of the subject area, definition of goals and ways to achieve them.

B14 – Determining task deadlines and forming technical specifications.

B15 – Formalization of the task, defining priorities.

B16 – Selection of optimal solutions. Graduates must be able to analyze possible solutions and choose optimal approaches to specific problems. This includes evaluating resources, costs, and time constraints, as well as analyzing risks in choosing solutions. Graduates must be able to analyze possible solutions and choose optimal approaches to specific problems. This includes evaluating resources, costs, and time constraints, as well as analyzing risks in choosing solutions.

B17 – Planning project execution stages.

B18 – Modeling the structure of the subject area.

B19 – Defining functional and operational requirements for system components.

B20 – Using UML standards to present technical documentation, diagrams, models.

B21 – Maintaining project execution records.

B22 – Preparing reports.

B23 – Creating models and methods for data analysis.

B24 – Developing decision-making systems based on AI models.

B25 – Knowledge of IT trends.

B26 – Applicability of tools and technologies for problem-solving.

B27 – Evaluating the adequacy of the designed model.

B28 – Assessing the efficiency of methods and models used.

P – Professional competencies:

P1 – Analysis of the subject area, defining goals and ways to achieve them.

P2 – Setting task deadlines and creating technical specifications.

P3 – Formalizing tasks and determining priorities.

P4 – Selecting optimal solutions.

P5 – Planning project execution stages.

P6 – Modeling the structure of the subject area.

P7 – Defining functional and operational requirements for system components.

P8 – Using UML standards to present technical documentation, diagrams, models.

P9 – Maintaining project execution records.

P10 – Preparing reports.

P11 – Designing database models.

P12 – Developing and designing software interfaces.

P13 – Building algorithms for computing processes.

P14 – Creating models for data processing and analysis.

P15 – Writing, testing, debugging, maintaining, and integrating software codes and products.

P16 – Evaluating the efficiency of technologies and tools used.

P17 – Choosing appropriate architectural solutions for creating software products.

P18 – Developing software solutions for various platforms and devices.

P19 – Evaluating software quality.

P20 – Using modern tools and technologies for automating development processes.

P21 – Implementing and supporting DevOps practices.

P22 – Designing fail-resistant systems.

P23 – Managing software development projects.

P24 – Applying machine learning and AI methods.

P25 – Configuring and administering servers and cloud systems.

P26 – Integrating software systems with external APIs and services.

P27 – Managing and scaling databases.

P28 – Optimizing and refactoring software systems.

P29 – Developing and testing user interfaces (UX/UI).

G – General human, social, and ethical competencies:

G1 – Knowledge of the historical, cultural, and scientific achievements of the Republic of Kazakhstan.

G2 – Broad socio-political, professional, and cultural awareness.

G3 – Understanding fundamental philosophical and ethical principles.

G4 – Ability to think critically and logically.

G5 – Proficiency in Kazakh, Russian, and foreign languages.

G6 – Ability to plan and organize one's work and scientific activity.

G7 – Skills in preparing and editing information, working with scientific documentation.

G8 – Ability to clearly and persuasively express ideas in both oral and written forms.

G9 – Ability to critically analyze existing concepts and theories.

G10 – Ability to apply ethical norms and principles in professional activity.

S – Special and managerial competencies:

S1 – Ability to set goals and plan ways to achieve them.

S2 – Ability to manage projects and coordinate teams.

S3 – Research skills and data handling.

S4 – Ability to organize IT department work.

S5 – Ability to make managerial decisions and solve complex problems.