

Approved

by the Order of the Ministry of Education

and Science of the Russian Federation

of September 19, 2017, No. 929

**FEDERAL STATE EDUCATIONAL STANDARD OF HIGHER  
EDUCATION – BACHELOR’S DEGREE IN THE FIELD OF TRAINING**

**09.03.01 INFORMATION AND COMPUTER SCIENCE**

1.1. The present federal state educational standard of higher education (further – FSES HE) represents a set of obligatory requirements for the implementation of the main professional educational programmes of higher education - bachelor's degree programmes in the field of training 09.03.01 Information and computer science (further respectively - the bachelor's degree programme, a field of training).

1.2 Getting education under the bachelor's degree programme is allowed only in an educational organization of higher education (hereinafter - the Organization).

1.3. The Bachelor's degree programme can be implemented in the Organization in a full-time, part-time and extramural form.

1.4. The content of higher education in the field of training is determined by the Bachelor's degree programme established and approved by the Organization independently. When establishing a bachelor's degree programme, the Organization set up requirements for the program learning outcomes as universal, general professional and professional competencies of graduates (hereinafter - competencies).

The Organization establishes the bachelor's degree programme in accordance with FSES HE, taking into account the corresponding suggested main educational

programme included in the register of suggested main study programmes (hereinafter - SMSP).

1.5. When implementing the Bachelor's degree programme, the Organization has the right to use e-learning, distance learning technologies.

E-learning, distance learning technologies used in the education of the disabled and persons with disabilities (hereinafter - the disabled and persons with disabilities), should provide the possibility of receiving and passing information in accessible forms.

The implementation of a bachelor's degree programme using only e-Learning and distance learning technologies is not permitted.

1.6. The implementation of the bachelor's programme is carried out by the Organization both independently and through a network form.

1.7. The bachelor's degree programme is implemented in the state language of the Russian Federation unless otherwise stipulated by a local normative act of the Organization.

1.8. The period of obtaining education under the bachelor's degree programme (regardless of the applied educational technologies):

full-time education, including vacation, provided after passing the state final examination is 4 years;

in part-time and extramural forms of education the period of obtaining the education is prolonged by not less than 6 months and not more than 1 year as compared to the period of obtaining education in a full-time form;

in case the disabled and persons with disabilities study under individual educational plans, at their request the study period can be prolonged by no more than 1 year compared to the period of education established for the respective form of study.

1.9. The volume of the bachelor's degree programme is 240 credits/ credit points (hereinafter referred to as "CP") regardless of the form of education, applied educational technologies, implementation of the bachelor's degree programme using the network form, implementation of the bachelor's programme according to the individual education plan.

The volume of the bachelor's programme realized during one academic year makes up no more than 70 credit points, irrespective of the form of education, applied educational technologies, realization of the bachelor's programme with the use of the network form, implementation of the bachelor's programme under the individual study plan (except the accelerated education), and in case of accelerated education - no more than 80 credit points.

1.10. Within the period and volumes established by paragraphs 1.8 and 1.9 of FSES HE, the organization independently determines:

the period of acquiring education under the bachelor's degree programme in full-time or part-time education, as well as under the individual education plan, including accelerated learning;

the volume of the bachelor's degree programme implemented during one academic year.

1.11. Fields of professional activities and spheres of professional activities in which graduates who have mastered the bachelor's programme (hereinafter - graduates) can carry out professional activities:

06 Signal -communication, information and communication technologies (in the sphere of design, development, implementation and operation of computer facilities and information systems, their life cycle management);

40 Cross-cutting professional activities in industry (in the sphere of organization and conduct of research and development work in the field of computer science and computer engineering).

Graduates can carry out professional activities in other professional areas and/or professional spheres provided that their level of education and acquired competences meet the employee's qualification requirements.

1.12. Within the framework of acquiring the Bachelor's degree programme, graduates can prepare for the professional activity tasks of the following types:

research;

industrial and technological;

organizational and managerial;

project,

1.13. When establishing the bachelor's degree programme, the Organization sets the focus (profile) of the bachelor's degree programme, which corresponds to the field of training in general or specifies the content of the bachelor's degree programme within the framework of the field of training by focusing on:

area(s) and sphere(s) of the graduates' professional activities;

the type(s) of tasks and objectives of the graduates' professional activities;

if necessary, the objects of the graduates' professional activities or field(s) of knowledge.

1.14. The bachelor's programme containing the data classified as the state secret is established and realized with observance of the requirements provided by the legislation of the Russian Federation and other normative legal acts in the field of protection of the state secret.

## II. Requirements to the structure of the bachelor's programme

2.1. The structure of the bachelor's degree programme includes the following blocks:

Block 1 "Disciplines (modules)";

Block 2 "Practice";

Block 3 "State final examination".

### Structure and volume of the bachelor's programme

Table

Bachelor's programme structure		Volume of the bachelor's programme and its blocks in credit points
Block 1	Disciplines (modules)	not less than 160
Block 2	Practice	not less than 20
Block 3	State final examination	not less than 9
Volume of the bachelor's programme		240

2.2. The bachelor's degree programme should provide implementation of disciplines (modules) on philosophy, history (history of Russia, general history), foreign language, life safety within Block 1 "Disciplines (modules)".

2.3 The Bachelor's degree programme should provide implementation of disciplines (modules) on physical training and sports:

in the volume not less than 2 credit points within Block 1 "Disciplines (Modules)";

in the volume of not less than 328 academic hours, which are mandatory for studying, are not transferred to credit points and are not included in the volume of the Bachelor's degree programme, within the volume of elective disciplines (modules) in full-time education.

Disciplines (modules) on physical training and sports are implemented in the way established by the Organization. For the disabled and persons with disabilities, the Organization establishes a special procedure for mastering disciplines (modules) on physical training and sports, taking into account their health condition.

2.4. Block 2 "Practice" includes practical training and industry-focused internship (hereinafter together - practices).

Types of practical training:

introductory practice;

technological (design and technological) practice;

maintenance practice;

research work (obtaining primary skills in research work).

Types of industry-focused internship:

technological (design and technological) practice;

maintenance practice;

research work.

(2.5) In addition to the types of practices specified in paragraph 2.4 of FSES HE, the SMSP may also contain recommended types of practices.

2.6. The organization:

selects one or more types of practical training and one or more types of industry-focused internship from the list specified in paragraph 2.4 of FSES HE;

can select one or more the types of practical training and/or industry-focused internship from the recommended SMSP, if any;

can establish an additional type(s) of practical training and/or industry-focused internship;

sets the volume of each type of practices.

2.7 Block 3, State Final Examination, includes:

preparation for and taking the state exam (if the Organization has included the state exam into the state final examination);

preparation and defense of final qualification work.

2.8. In the bachelor's degree programme, students are provided with the opportunity to study elective disciplines (modules) and optional disciplines (modules).

Optional disciplines (modules) are not included in the volume of the bachelor's degree programme.

2.9. Within the bachelor's degree programme there is the obligatory part and the part formed by the education process participants.

The obligatory part of the Bachelor's degree programme includes disciplines (modules) and practices that provide the development of general professional competencies, as well as professional competencies established by the SMSP as mandatory (if any).

The obligatory part of the Bachelor's degree programme includes, inter alia:

disciplines (modules) specified in paragraph 2.2 of FSES HE;

disciplines (modules) on physical training and sport, implemented within Block 1 "Disciplines (modules)".

Disciplines (modules) and practices ensuring the development of universal competencies can be included in the mandatory part of the bachelor's programme and in the part formed by participants of educational process.

The volume of the obligatory part, without the volume of the state final examination, should be not less than 40% of the total volume of the bachelor's degree programme.

2.10. The organization must provide the disabled and persons with disabilities (upon application) the opportunity to study the bachelor's degree programme, taking into account the peculiarities of their psychophysical development, individual capabilities and, if necessary, providing correction of development disorders and social adaptation of these persons.

2.11. The implementation of a part(parts) of the study programme and the state final examination, that provide students with the confidential data and (or) secret samples of weapons, military equipment and their components for educational purposes, is not allowed when using e-learning and distance technologies.

### **III. Requirements for learning outcomes of the bachelor's degree program**

3.1 As a result of mastering the bachelor's degree program, the graduates shall have competencies registered in the bachelor's degree program.

3.2. The bachelor's degree programme must contain the following universal competencies (hereinafter- UC):

Name of the universal competencies category (group)	Code and name of the graduate's universal competencies
Systems and critical thinking	UC-1. Search, critically analyze and synthesize information, apply a systems-based approach to solve the given tasks

Project development and implementation	UC-2. Determine the range of tasks within the set goal and choose the optimal ways of their solution, based on the existing legal norms, available resources and limits
Teamwork and leadership	UC-3. Make social interaction and realize his/her role in the team
Communication	UC-4. Conduct business communication orally and in writing using the state language of the Russian Federation and foreign language(s)
Intercultural cooperation	UC-5. Understand the intercultural diversity of society in social-historical, ethical and philosophical contexts
Self-organization and self-development (including health protection)	UC-6. Manage time, make and implement a personal development path based on the principles of lifelong learning
	UC-7. Keep an adequate level of physical fitness to ensure full social and professional activity
Life safety	UC-8. Create and keep safe living conditions, including in case of emergency situations

3.3. The Bachelor's degree programme must contain the following general professional competencies (hereinafter – GPC), so that the graduate is able to:

GPC-1. Apply natural science and general engineering knowledge, methods of mathematical analysis and modeling, theoretical and experimental research in professional activity;

GPC-2. Use modern information technologies and software, including domestically produced, to solve professional tasks;

GPC-3. Solve standard professional tasks on the basis of information and bibliographic literacy using information and communication technologies and taking into account the basic requirements of information security;

GPC-4. Participate in the development of standards, norms and regulations, as well as technical documentation related to professional activity;

GPC-5. Install software and hardware for information and automated systems;

GPC-6. Develop business plans and technical tasks to equip departments, laboratories, offices with computer and network equipment;

GPC-7. Participate in adjustment and repairing of hardware-software complexes;

GPC-8. Develop algorithms and programs suitable for practical application;

GPC -9. Master methods of using software to solve practical tasks.

3.4. The professional competencies in the bachelor's degree program are established on the basis of professional standards corresponding to the graduates' professional activity (if any), as well as, if necessary, on the basis of the analysis of requirements for professional competencies imposed on graduates by the labor market, analysis of domestic and foreign best practice, consultations with leading employers, employers' associations of the industry, and other sources (hereinafter - other requirements imposed on graduates).

Professional competencies may be established by the SMSP as mandatory and/or recommended competencies (hereinafter referred to as mandatory competencies, recommended competencies).

3.5. When determining the professional competencies in the Bachelor's degree program, the Organization:

shall include all the required professional competencies (if any) into the bachelor's degree program;

may include one or more recommended professional competencies (if any) into the bachelor's degree program;

includes one or more independently determined professional competencies based on the focus (profile) of the bachelor's degree program, based on professional standards corresponding to the graduates' professional activity (if any), and, if necessary, based on an analysis of other requirements for graduates (The Organization has the right not to include independently determined professional competencies, if there are mandatory professional competencies, as well as in case of inclusion of three recommended professional competences into the bachelor's degree program).

When determining professional competencies on the basis of professional standards, the Organization selects professional standards corresponding to the graduates' professional activity from among those listed in the annex to the FSES HE and/or other professional standards corresponding to the graduates' professional activities from the register of professional standards (list of professional activity types) available on the specialized website of the Ministry of Labor and Social Protection of the Russian Federation and called "Professional Standards" (<http://profstandart.rosmintrud.ru>) (if any corresponding professional standards)

In each selected professional standard the Organization chooses one or more integrated job functions (hereinafter referred to as IJF) corresponding to the graduates' professional activity based on the professional standard for the IJF qualification level and the requirements of the section " Requirements for Education and Training ". IJF can be allocated in whole or in part.

3.6 The set of competencies established by the Bachelor's degree program shall ensure that the graduate is able to perform professional activities in at least one professional field and area of professional activity established in accordance with paragraph 1.11 FSES HE and solve professional tasks of at least one type established in accordance with paragraph 1.12 FSES HE.

3.7. In the bachelor's program the organization establishes indicators of competence achievement:

universal, general professional and, if any, mandatory professional competencies - in accordance with the competence achievement indicators established by the SMSP;

recommended professional competencies and self-established professional competencies (if any) - independently.

3.8. The organization independently plans the learning outcomes in disciplines (modules) and practices, which should correspond to the competence achievement indicators established in the bachelor's program.

The set of planned learning outcomes in disciplines (modules) and practices should ensure that the graduate can acquire all the competencies established in the bachelor's program.

#### **IV. Requirements for the conditions of the bachelor's program implementation**

4.1. Requirements for the conditions of the bachelor's program implementation consist of system-wide requirements, requirements for material and technical, educational and methodological support, requirements for human resources and financial conditions of the bachelor's program implementation, as well as requirements for the mechanisms applied to quality evaluation of students' educational activities and training under the bachelor's program.

#### **4.2. System-wide requirements for the bachelor's degree program implementation.**

4.2.1. On the right of ownership or other legal basis the organization shall have the material and technical support of educational activities (premises and

equipment) for the bachelor's program implementation regarding Block 1 "Disciplines (modules)" and Block 3 "State final examination" in accordance with the curriculum.

4.2.2 During the whole period of study, each student shall be provided with individual unlimited access to the electronic information and education environment of the Organization from any location where there is an access to the information and telecommunication network "Internet" (hereinafter - "Internet"), both on the territory of the Organization and outside it. The functioning conditions of the electronic information and education environment may be provided with the use of other organizations' resources.

The electronic information and education environment of the Organization shall provide:

access to curricula, working programs of disciplines (modules), practices, electronic educational publications and electronic educational resources specified in working programs of disciplines (modules), practices;

creation of a student's electronic portfolio, including his/her saved works and grades for these works.

When the bachelor's program is implemented with the use of e- learning, distance learning technologies, the Organization's electronic information and educational environment shall provide in addition:

registering the course of the educational process, the interim assessment results and the learning outcomes of the Bachelor's degree program;

conducting training sessions, procedures of learning outcomes assessment when their implementation is provided with the use of e-learning, distance learning technologies;

interaction between the educational process participants, including synchronous and (or) asynchronous interaction via the Internet.

The functioning of the electronic information and educational environment is ensured by the appropriate means of information and communication technologies and the qualification of employees who use and support it. The functioning of the electronic information and education environment shall comply with the Russian legislation.

4.2.3. When implementing the bachelor's degree program in a network form, the requirements for the bachelor's program implementation shall be provided with a combination of material-technical and educational-methodological resources provided by the organizations involved in the bachelor's program implementation in a network form.

### **4.3 Requirements for material-technical and educational-methodological support of the bachelor's degree program.**

4.3.1 Premises shall include classrooms for conducting classes and training activities under the bachelor's program, with all the training equipment and technical study aids determined in the working programs of disciplines (modules).

Rooms for students' independent work shall be equipped with computers with the Internet access and provide access to the Organization's electronic information and educational environment.

The equipment may be replaced by their virtual counterparts.

4.3.2. The Organization shall have the necessary set of licensed and freely distributed software, including domestically produced one (the list is defined in the working programs of disciplines (modules) and shall be updated if necessary).

4.3.3. When printed publications are used in the educational process, the library shall be equipped with printed publications with the minimal ratio of 0.25 copies per student. The copies are of the editions specified in the working programs of disciplines (modules), practices. The students are from among those who

simultaneously study the corresponding discipline (module) or taking the corresponding practice.

4.3.4 Students including those who study using e-learning, distance learning technologies, shall be provided with access (remote access), to modern professional databases and information reference systems. Their list is determined in the working programs of disciplines (modules) and shall be updated (if necessary).

4.3.5 The disabled students and students with disabilities shall be provided with printed and/or electronic educational resources in forms adapted to their health limitations.

#### **4.4. Requirements for staff implementing the bachelor's degree program.**

4.4.1 The implementation of the Bachelor's degree program is provided by the academic staff of the Organization, as well as persons engaged by the Organization in the bachelor's program implementation on other terms.

4.4.2 The qualifications of the Organization's academic staff shall meet the qualification requirements specified in qualification manuals and/or professional standards (if any).

4.4.3. At least 60% of the Organization's academic staff involved in the bachelor's program implementation, and persons engaged by the Organization in the bachelor's program implementation on other terms (based on the number of part-time positions brought to the number of full-time positions), shall do research, educational, methodological and (or) practical training corresponding to the profile of the discipline (module) being taught.

4.4.4. At least 5% of the Organization's academic staff involved in the bachelor's program implementation and persons engaged by the Organization in the bachelor's program implementation on other terms based on the number of

part-time positions brought to the number of full-time positions) shall be head managers and (or) employees of other organizations in the professional sphere, corresponding to the occupational field the students' training is aimed for (have at least 3-year experience in the occupational field).

4.4.5. At least 50 % of the Organization's academic staff and persons involved in the Organization's educational activities on other terms (based on the number of part-time positions brought to the number of full-time positions), shall have a degree (including a degree obtained in a foreign state and recognized in the Russian Federation) and/or academic title (including a degree obtained in a foreign state and recognized in the Russian Federation).

#### **4.5 Requirements for financial conditions of the bachelor's program implementation.**

4.5.1. Financial support for the bachelor's program implementation shall be carried out in the amount not lower than the basic cost norms for the provision of public services to implement study programs of higher education - bachelor's degree programs and the values of correction coefficients to the basic cost norms determined by the Ministry of Education and Science of the Russian Federation

#### **4.6. Requirements for the applied mechanisms of quality evaluation of students' educational activities and training under the bachelor's degree program.**

4.6.1 The quality of students' educational activities and training under the bachelor's study program is determined within the system of internal evaluation, as well as the system of external evaluation that is voluntary for the Organization.

4.6.2 In order to improve the bachelor's degree program, while conducting regular internal evaluation of the quality of students' educational activities and

training under the bachelor's degree program, the Organization involves employers and (or) their associations, other legal entities and (or) individuals, including the Organization's academic staff.

The internal system of quality evaluation of students' educational activities under the bachelor's degree program shall provide with the opportunity to assess the conditions, content, organization and quality of the educational process as a whole and separate disciplines (modules) and practices.

4.6.3 The external quality assessment of educational activities under the bachelor's program within the state accreditation procedure is carried out to confirm the compliance of the bachelor's program educational activities with the requirements of the Federal State Educational Standards and the Regulations of the Russian Federation taking into account the relevant SMSP.

4.6.4 External quality assessment of educational activities and training of Bachelor's program students may be carried out by professional and public accreditation conducted by employers, their associations, as well as their authorized organizations, including foreign organizations, or authorized national professional and public organizations that are part of international structures, in order to recognize the quality and level of graduates' training to meet the requirements of professional standards (if any) and labour market for the specialists of the corresponding profile.

Annex  
to the Federal State Educational Standard  
of Higher Education – bachelor’s degree  
in the field of training 09.03.01  
Information and Computer Science,  
approved by the order  
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**LIST**  
**OF PROFESSIONAL STANDARDS**  
**COMPLIANT TO THE OCCUPATIONAL FIELD OF GRADUATES WHO**  
**WAS GRANTED THE BACHELORS DEGREE IN THE FIELD**  
**09.03.01 INFORMATION AND COMPUTER SCIENCE**

№	Professional standard code	Name of the occupational field Name of the professional standard
06 Signal-communication, information and communication technologies		
1	06.001	Professional standard "Programmer", approved by order of the Ministry of Labor and Social Protection of the Russian Federation of November 18, 2013 N 679n (registered by the Ministry of Justice of the Russian Federation on December 18, 2013, registration N 30635), as amended by order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered by the Ministry of Justice of the Russian Federation January 13, 2017, registration N 45230)

2.	06.004	Professional standard "Test engineer in the field of information technology", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation from April 11, 2014 N 225n (registered by the Ministry of Justice of the Russian Federation on June 9, 2014, registration N 32623), as amended by Order of the Ministry of Labor and Social Protection of the Russian Federation from December 12, 2016. N 727n (registered with the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)
3.	06.011	Professional standard "Database Administrator", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation of 17 September 2014 N 647n (registered by the Ministry of Justice of the Russian Federation on 24 November 2014, registration N 34846), as amended by Order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered with the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)
4.	06.015	Professional standard "Information Technology System Specialist", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation from November 18, 2014 N 896n (registered by the Ministry of Justice of the Russian Federation on December 24, 2014, registration N 35361), as amended by Order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered by the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)

5.	06.016	Professional standard "Project Manager in the field of information technology", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation of November 18, 2014 N 893n (registered by the Ministry of Justice of the Russian Federation on December 9, 2014, registration N 35117), as amended by Order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered with the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)
6.	06.019	Professional standard "Technical writer (specialist in technical documentation in the field of information technology)", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation of 8 September 2014 N 612n (registered by the Ministry of Justice of the Russian Federation on October 3, 2014, registration N 34234), as amended by Order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered with the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)

7.	06.022	Professional standard "Systems Analyst", approved by order of the Ministry of Labor and Social Protection of the Russian Federation on October 28, 2014 N 809n (registered by the Ministry of Justice of the Russian Federation on November 24, 2014, registration N 34882), as amended by order of the Ministry of Labor and Social Protection of the Russian Federation of December 12, 2016. N 727n (registered by the Ministry of Justice of the Russian Federation on January 13, 2017, registration N 45230)
8.	06.025	Professional standard "Specialist in design of graphic and user interfaces", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation on October 5, 2015 N 689n (registered by the Ministry of Justice of the Russian Federation on October 30, 2015, registration N 39558)
9.	06.026	Professional standard "System administrator of information and communication systems", approved by Order of the Ministry of Labour and Social Protection of the Russian Federation on October 5, 2015 N 684n (registered by the Ministry of Justice of the Russian Federation on October 19, 2015, registration N 39361)
10.	06.027	Professional standard "Specialist in the administration of network devices of information and communication systems", approved by Order of the Ministry of Labour and Social Protection of the Russian Federation on October 5, 2015 N 686n (registered by the Ministry of Justice of the Russian Federation on October 30, 2015, registration N 39568).

11.	06.028	Professional standard "System programmer", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation on October 5, 2015 N 685n (registered by the Ministry of Justice of the Russian Federation on October 20, 2015, registration N 39374).
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