

Abstract
of Bachelor's Degree Program
in Field of Education 18.03.01 Chemical Technology,
Discipline (Specialization) "Production of Pharmaceutical Products"
(Internal Study Mode)

Terms, Workload of the Degree Program and Qualification of Graduates

Name	Qualification	Term of education including the holidays provided after the completion of the State Final Certification	Workload (in credits)
Bachelor's degree program	Bachelor	4 years	240

Purpose (Mission) of the Degree Program

The mission of the bachelor's degree program in "Production of Pharmaceutical Products" is training of professionally-oriented qualified personnel in the field of production of medicinal products and the requirements of the good manufacturing practice, who are able to ensure production of medicinal products, medical devices at high professional level, in-process control of medicinal products and conditions of production including in the field of the development and registration of new pharmaceutical products.

The degree program is aimed at the implementation of the following principles, namely: application of the education results in professional practices; professional activities based on continuous development of new technologies of production of pharmaceutical products in the form of various dosage forms and the requirements of the good manufacturing practice; independent execution of tasks related to the production of pharmaceutical products and the requirements of the good manufacturing practice including aggregation and interpretation when selecting and justifying the process equipment and conditions of production of medicinal products.

Demand for Graduates

Graduates of the bachelor's degree program in "Production of Pharmaceutical Products" are in demand with engineering and production units, as well as departments for development of new medicinal products of pharmaceutical enterprises, quality control departments, quality assurance units of pharmaceutical enterprises, departments for development of documentation and validation, units responsible for carrying out of external and internal audits, in the system of state registration and certification of medicinal products, scientific laboratories of medicinal products, production units producing medicinal products for veterinary use and biologically active supplements, cosmetics, foodstuffs and other production units developing and producing medicinal products and medical devices. Graduates are in demand with pharmaceutical companies as technologists and supervisors of production of solid, soft and liquid dosage forms, sterile products for injections, infusions and ophthalmology.

Requirements for Enrollment in the Degree Program

The persons with at least general secondary education who have passed entrance examinations in accordance with the Regulations for Admission to Higher Education Programs, namely bachelor's degree programs, specialist's and master's degree programs, are allowed for enrollment.

Graduate's Qualification Characteristic

Areas of Professional Activity

The area of professional activity of graduates who have completed the bachelor's degree program includes scientific research work related to the use of chemical phenomena and processes; the field of engineering and manufacturing, organization and management and design fields of activities.

According to the register of professional standards (the list of types of professional activity approved by Order No. 667n of the Ministry of Labor of Russia dated 29.09.2014), the areas of professional activity and fields of professional activity which the graduates who have completed the bachelor's degree program (hereinafter referred to as graduates) can be engaged in include:

02 Healthcare (in the field of production, quality assurance and development of new medicinal products, in the field of quality control of raw materials and finished products of the pharmaceutical industry);

Graduates can be engaged in professional activity in other areas and (or) fields of professional activity if their education level and acquired competences correspond to the employee's qualification.

Objects of Professional Activity

In accordance with the types of professional activity, the objects of professional activity of graduates of the bachelor's degree program "Production of Pharmaceutical Products" are:

- chemical substances and materials
- methods, ways and means of obtaining substances and materials using physical, physical and chemical, chemical processes, production of medicinal products on their basis
- equipment, engineering processes and industrial systems of process media preparation for industrial manufacturing of active pharmaceutical ingredients and finished medicinal products
- equipment, engineering processes and industrial systems of obtaining substances including active pharmaceutical ingredients and finished medicinal products
- pharmaceutical quality system including documentation of pharmaceutical enterprises in the field of production of active pharmaceutical ingredients and finished medicinal products, quality assurance of medicinal products.

Types of Professional Activity

Types of professional activity which graduates of the bachelor's degree program are prepared for:

- scientific research;
- engineering;
- project.

Tasks of Professional Activity

The graduate who has completed the bachelor's degree program is ready to carry out the following types of job tasks:

- **Scientific research:**
- development of new technologies of medicinal substances production;
- development of new analysis methods for half-products and finished products obtained using chemical synthesis;
- justifying the terms of products storage;
- **Engineering:**
- production of medicinal substances, vitamins and aroma compounds;
- organization and implementation of measures for purchase and storage of raw materials for production of active pharmaceutical ingredients, measures for waste neutralization and treatment;
- management of personnel labor at pharmaceutical enterprises and their structural units proceeding from the health and safety requirements;
- compliance with the basic requirements of information security.
- **Project:**
- development of production projects for pharmaceutical ingredients, including drawings, diagrams, material, thermal, hydromechanical calculations, layout arrangements of manufacturing buildings.

List of Professional Standards Corresponding to the Professional Activity of Graduates Who Have Completed the Degree Program

I tem No.	Code of professional standard	Name of professional standard
02 Healthcare		
1	02.010	Specialist in industrial pharmacy in the field of research of medicinal products

2	02.011	Specialist in validation (qualification) of pharmaceutical manufacturing
3	02.013	Specialist in industrial pharmacy in the field of quality control of medicinal products
4	02.014	Specialist in industrial pharmacy in the field of quality assurance of medicinal products
5	02.016	Specialist in industrial pharmacy in the field of production of medicinal products

General Characteristic of the Degree Program

Planned results of completing of the degree program (competences) and indicators of their achievement

In accordance with the aims of the degree program and type of tasks of professional activity, the graduate of the bachelor's degree program "Production of Pharmaceutical Products" shall have the following competences characterized by the indicators of their achievement

Code and name of the graduate's UC	Code and name of indicator of the graduate's UC
UC-1. Able to search, critically analyze and synthesize information, use the system approach for solving the set tasks	UC-1.1. Analyzes the task, emphasizing its basic components
	UC-1.2. Determines, interprets and ranks the information required for carrying out the set task
	UC-1.3. Searches information for carrying out the set task for different types of queries
	UC-1.4. During the information processing, distinguishes facts from opinions, interpretations, assessments, forms their own opinions and judgments, gives the reasons for their conclusions and point of view also using a philosophical conceptual framework
	UC-1.5. Considers and suggests possible variants of solutions to the set tasks assessing their advantages and disadvantages
UC-2. Able to determine the range of tasks within the set goal and choose the most appropriate ways of solving them in accordance with the current law, available resources and limits	UC-2.1. Determines the range of tasks within the set goal, determines links between them
	UC-2.2. Suggests ways of solving the set tasks and the expected results; assesses the suggested ways in terms of corresponding to the project goal
	UC-2.3. Plans the implementation of tasks in their area of responsibility given the available resources and limits, in accordance with the current law
	UC-2.4. Carries out the tasks in their area of responsibility in accordance with the planned results and control points, corrects the ways of tasks solving if necessary
UC-3. Able to be involved in social interaction and play their role in the team	UC-3.1. Determines their role in social interaction and teamwork at the pharmaceutical enterprise based on the strategy of cooperation for achieving the set goal
	UC-3.2. When playing their role in social interaction and teamwork, takes into account the particularities of behavior and interests of other team members of the pharmaceutical enterprise
	UC-3.3. Analyzes possible consequences of personal actions in social

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	interaction and teamwork and taking this into account makes productive interaction in the team of the pharmaceutical enterprise
	UC-3.4. Exchanges information, knowledge and experience with team members of pharmaceutical enterprise; assesses ideas of other team members for achieving the set goal
	UC-3.5. Complies with the standards and established rules of teamwork; takes personal responsibility for the result
UC-4. Able to communicate for business in oral and written form using the official language of the Russian Federation and foreign language(s)	UC-4.1. Chooses the style of communicating in Russian language depending on the goal and conditions of partnership; adapts speech, communication style and body language to the situations of interaction
	UC-4.2. Maintains business correspondence in Russian, given the stylistics features of formal and informal letters
	UC-4.3. Maintains business correspondence in a foreign language, given the stylistics features of formal letters and social and cultural differences
	UC-4.4. Translates official and professional texts from a foreign language into Russian and from Russian into a foreign language for personal advantage
	UC-4.5. Makes a public appearance with a speech in Russian, builds their speech so as to meet the audience and the purpose of communication
	UC-4.6. Orally presents the results of their activities in a foreign language, can support the conversation during the discussion of the results
UC-5. Able to perceive the intercultural diversity of the society in socio-historical, ethical, and philosophical contexts	UC-5.1. Distinguishes and analyzes the peculiarities of inter-cultural collaboration (advantages and possible problem situations) arising due to differences in ethical, religious and value systems of team members of a pharmaceutical enterprise
	UC-5.2. Suggests ways to overcome communication barriers in inter-cultural collaboration within the team of a pharmaceutical enterprise
	UC-5.3. Defines the conditions for the integration of inter-cultural collaboration participants for achievement of the set goal, proceeding from legacy and social and cultural traditions of different social groups, ethnicities and religious denominations
UC-6. Able to manage their time, build and implement a self-development path based on the lifelong learning principles	UC-6.1. Uses time management tools and techniques when performing specific tasks, implementing specific projects, and achieving set goals
	UC-6.2. Sets the priorities of their activities, personal development and professional growth

Code and name of the graduate's UC	Code and name of indicator of the graduate's UC
	UC-6.3. Evaluates the labor market requirements and the educational service offering to build a professional growth path of their own
	UC-6.4. Builds a professional career ladder and establishes a professional development strategy
UC-7. Able to maintain an adequate level of physical fitness to ensure full-fledged social and professional activities	UC-7.1. Chooses health-saving technologies to ensure wellness management, given the physiological make-up and the conditions for implementation of professional activities
	UC-7.2. Schedules their work and free time for an optimal combination of physical load and mental burden as well as performance assurance
	UC-7.3. Follows and promotes healthy lifestyle standards in various life situations and professional activities
UC-8. Able to create and maintain safe standards of living in everyday life and professional activities to preserve the natural environment, ensure the sustainable development of the society, including in case of threat or occurrence of emergencies and military conflicts	UC-8.1. Analyzes factors of harmful effect of parts of the environment (facilities, engineering processes, materials, buildings and structures, natural and social phenomena)
	UC-8.2. Identifies hazardous and harmful factors within the activity undertaken
	UC-8.3. Identifies problems related to safety violations at the workplace; suggests actions to prevent emergencies
	UC-8.4. Explains the rules of conduct in case of natural and man-made emergencies; administers first aid, describes the ways of being engaged in rehabilitation measures
UC-9. Able to use basic defectological knowledge in social and professional spheres	UC-9.1. Able to be involved in social and professional interaction in accordance with general idea on developmental challenges of persons with special needs
	UC-9.2. Contributes to the protection and implementation of children rights and persons with special needs in social and professional spheres
UC-10. Able to make reasoned economic decisions in various areas of life	UC-10.1 Makes decisions on personal financial management based on knowledge of basic categories and concepts of market economy, regularities of behavior of different economic entities, including in the pharmaceutical market in the context of limited resources
	UC-10.2. Participates in the implementation of economic activities of the unit of a pharmaceutical enterprise, considering the theoretical basis of business activities based on knowledge of economic patterns and relations

Code and name of the graduate's UC	Code and name of indicator of the graduate's UC
UC-11. Able to form an intolerant attitude towards corrupt conduct	UC-11.1. Understands the meaning of basic legal categories, the essence of corrupt conduct, forms of its manifestation in various fields of public life, including civil circulation of medicinal products
	UC-11.2. Identifies and assesses risks of corruption, shows intolerant attitude towards corrupt conduct in various fields of public life, including civil circulation of medicinal products
	UC-11.3. Knows how to correctly analyze, interpret and apply the rules of law in various fields of social activities, as well as in anti-corruption management. Undertakes social and professional activities based on a developed legal consciousness and formed legal culture
GPC-1. Able to study, analyze, use the mechanisms of chemical reactions occurring in engineering processes and the environment, based on knowledge about the structure of substance, the nature of chemical bonding and the properties of various classes of chemical elements, compounds, substances and materials	GPC-1.1. Uses knowledge of the structure of substance, the nature of chemical bonding for characterization of various classes of chemical compounds and their properties
	GPC-1.2. Suggests an interpretation of various engineering processes based on knowledge of various classes of chemical elements, compounds, substances, and materials
	GPC-1.3. Analyzes and uses mechanisms of chemical reactions to explain engineering processes and processes occurring in the environment.
	GPC-1.4. Interprets the structure of substance based on physical and chemical principles and patterns
GPC-2. Able to use mathematical, physical, physical and chemical, chemical methods to solve tasks of the professional activity	GPC-2.1 Uses knowledge in the field of mathematics to solve tasks of the professional activity
	GPC-2.2 Applies main methods and techniques for measuring physical and physical and chemical parameters of objects and processes
	GPC-2.3 Systematizes and analyzes the results of physical and chemical, chemical experiments, observations, measurements, as well as the results of calculations of substance and material properties
GPC-3. Able to perform professional activities taking into account legislation of the Russian Federation, including in the field of economics and ecology	GPC-3.1. Undertakes professional activities taking into account regulatory legal acts governing the relations between individuals and legal entities in the pharmaceutical market
	GPC-3.2. Undertakes professional activities taking into account regulatory legal acts governing the assurance of environmental safety in the production of medicinal products
GPC-4. Able to ensure conduct of engineering process, use	GPC-4.1. Calculates and measures the parameters of engineering processes

Code and name of the graduate's UC	Code and name of indicator of the graduate's UC
<p>technical means to control parameters of the engineering process, properties of raw materials and finished products, make changes to the parameters of the engineering process if properties of raw materials change.</p>	<p>GPC-4.2. Uses technical means to control and monitor parameters of engineering process, properties of raw materials, materials and finished products based on knowledge of principles of electrical devices applied</p>
	<p>GPC-4.3. Undertakes reasonable selection of automated means of control and management of engineering process</p>
<p>GPC-5. Able to perform experimental research and tests according to a given technique and observations and measurements proceeding from the health and safety requirements, to handle and interpret experimental data</p>	<p>GPC-5.1. Performs experimental research and tests according to a given technique, handles and interprets experimental data obtained</p>
	<p>GPC-5.2. Performs observations and measurements proceeding from the health and safety requirements, including when working with equipment and chemical substances</p>
<p>GPC-6. Able to understand the operating principles of state-of-the-art IT solutions and apply them in solving tasks of professional activity</p>	<p>GPC-6.1. Applies basic knowledge of the underlying principles, methods, and properties of IT solutions when selecting software for solving job tasks</p>
	<p>GPC-6.2. Assesses IT solutions and software used in solving job tasks in terms of obsolescence and selects today's software</p>
<p>PC-1. Able to perform works on quality control of pharmaceutical manufacturing</p>	<p>PC-1.1. Performs sampling and recording of medicinal product samples, starting materials and packaging materials, intermediate products and objects of manufacturing environment, including works on microbial quality</p>
	<p>PC-1.2. Performs tests of medicinal product samples, starting materials and packaging materials, intermediate products and objects of manufacturing environment, including tests on microbial quality</p>
<p>PC-2. Able to conduct engineering processes in the production of medicinal products</p>	<p>PC-2.1. Performs development, preparation and operation of cleanrooms and equipment for production of medicinal products, including microbial quality</p>
	<p>PC-2.2. Performs processing operations in the production of medicinal products taking into account physico-technological properties of medicinal product components</p>
	<p>PC-2.3. Performs control of the engineering process in industrial manufacturing of medicinal products, as well as the control of compliance with the health and safety regulations when carrying out engineering process</p>

Code and name of the graduate's UC	Code and name of indicator of the graduate's UC
	PC-2.4. Prepares personnel for carrying out process works
PC-3. Able to perform works related to the pharmaceutical quality system of medicinal products manufacturing	PC-3.1. Manages the documentation of the pharmaceutical quality system
	PC-3.2. Conducts audit of quality and self-inspection of pharmaceutical manufacturing, contract manufacturers and suppliers
	PC-3.3. Chooses type of validation and qualification for objects in production of medicinal products
PC-4. Able to perform works in pharmaceutical development of medicinal products	PC-4.1. Carries out research, tests and experimentation in pharmaceutical development in accordance with the approved plans
	PC-4.2. Develops new regulatory documentation for medicinal products
	PC-4.3. Applies methods statistical processing of obtained results of research, tests and experiments using today's software
PC-5. Able to develop process documentation in industrial manufacturing of medicinal products	PC-5.1. Develops manufacturing specification and documentation for working with process equipment including drawings of equipment, its parts
	PC-5.2. Develops standard operating procedures for the preparation of manufacturing equipment, conduct of processing operations and filling in the process documentation

Curriculum of Bachelor's Degree Program in "Production of Pharmaceutical Products"

Mandatory part (name, workload, final discipline assessment)

1. History of Russia – 1 credit (36 hours), in-class work – 24 hours, pass-fail test
2. World History – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
3. Mathematics – 6 credits (216 hours), in-class work – 84 hours, examination
4. Physical Training and Sports – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
5. Computer Science – 3 credits (108 hours), in-class work – 38 hours, pass-fail test
6. Physics – 10 credits (360 hours), in-class work – 140 hours, examination
7. General and Inorganic Chemistry – 8 credits (288 hours), in-class work – 125 hours, pass-fail test, examination
8. Health and Wellness – 3 credits (108 hours), in-class work – 48 hours, pass-fail test
9. Methods of Mathematical Analysis – 5 credits (180 hours), in-class work – 72 hours, graded test
10. Foreign Language – 6 credits (216 hours), in-class work – 96 hours, pass-fail test
11. Business Communication in Foreign Language – 5 credits (180 hours), in-class work – 68 hours, pass-fail test
12. Examination in module "Foreign Language and Business Communication in Foreign Language" – 1 credit (36 hours), examination
13. Basics of Probability Theory and Mathematical Statistics – 4 credits (144 hours), in-class work – 50 hours, graded test

14. Analytical Chemistry – 5 credits (180 hours), in-class work – 80 hours, examination
15. Industrial Electronics and Electrical Engineering – 3 credits (108 hours), in-class work – 48 hours, graded test
16. Materials Science – 2 credits (72 hours), in-class work – 28 hours, pass-fail test
17. Physical Chemistry – 9 credits (324 hours), in-class work – 114 hours, pass-fail test, examination
18. Philosophy – 3 credits (108 hours), in-class work – 42 hours, graded test
19. Statistical Methods of Data Processing Using Software – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
20. Organic Chemistry – 11 credits (396 hours), in-class work – 178 hours, graded test, examination
21. Colloid Chemistry – 3 credits (108 hours), in-class work – 42 hours, graded test
22. Processes and Apparatus of Chemical Technology – 6 credits (216 hours), in-class work – 92 hours, examination
23. Legal Studies – 4 credits (144 hours), in-class work – 54 hours, graded test
24. Basics of Economics and Management of Pharmaceutical Manufacturing – 4 credits (144 hours), in-class work – 52 hours, course work, examination
25. General Chemical Technology – 4 credits (144 hours), in-class work – 52 hours, course work, graded test
26. Physical and Chemical Methods of Analysis – 3 credits (108 hours), in-class work – 42 hours, course work, graded test
27. Mass Exchange Processes and Apparatus of Chemical Technology – 5 credits (180 hours), in-class work – 78 hours, course project, examination
28. Chemistry of Biologically Active Substances – 2 credits (72 hours), in-class work – 30 hours, pass-fail test
29. Chemistry and Formulation of Herbal Medicinal Products – 5 credits (180 hours), in-class work – 78 hours, pass-fail test, examination
30. Formulation of Finished Medicinal Products – 7 credits (252 hours), in-class work – 94 hours, pass-fail test, course project, examination
31. Ecology – 2 credits (72 hours), in-class work – 26 hours, pass-fail test
32. Chemical Technology of Medicinal Substances and Vitamins – 8 credits (288 hours), in-class work – 112 hours, examination
33. Modeling of Chemical Technology Processes – 3 credits (108 hours), in-class work – 40 hours, pass-fail test
34. Chemical Technology Process Management Systems – 3 credits (108 hours), in-class work – 48 hours, graded test
35. Basics of Industrial Safety in Pharmaceutical Production Units – 2 credits (72 hours), in-class work – 26 hours, pass-fail test
36. Metrological Support of Pharmaceutical Production Units – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
37. Organization of Production according to GMP – 3 credits (108 hours), in-class work – 40 hours, pass-fail test

The part formed by participants of educational relations (name, workload, final discipline assessment)

38. Introduction to a Profession – 3 credits (108 hours), in-class work – 40 hours, pass-fail test
39. Engineering Drawing – 3 credits (108 hours), in-class work – 40 hours, graded test
40. Basics of Computer-Aided Design of Equipment Parts – 3 credits (108 hours), in-class work – 40 hours, course work, pass-fail test
41. Culture of Spoken Russian – 3 credits (108 hours), in-class work – 42 hours, pass-fail test
42. Economics – 3 credits (108 hours), in-class work – 44 hours, pass-fail test
43. Culture Studies – 3 credits (108 hours), in-class work – 36 hours, pass-fail test

44. Applied Mechanics – 6 credits (216 hours), in-class work – 72 hours, pass-fail test, course project, examination
45. Basics of Microbiology – 3 credits (108 hours), in-class work – 48 hours, pass-fail test
46. Equipment and Basics of Design of Pharmaceutical Products Production Units – 6 credits (216 hours), in-class work – 76 hours, pass-fail test, course work, graded test, examination
47. Basics of Project Management and Teambuilding – 3 credits (108 hours), in-class work – 48 hours, pass-fail test
48. Basics of Industrial Aseptics – 2 credits (72 hours), in-class work – 32 hours, pass-fail test
49. Conflict Resolution Studies – 4 credits (144 hours), in-class work – 54 hours, graded test
50. Professional Safety – 2 credits (72 hours), in-class work – 32 hours, pass-fail test

Elective disciplines in physical training and sports (name, workload, final discipline assessment)

51. Elective Physical Training and Sports: General Physical Preparedness – 328 hours, in-class work – 136 hours, pass-fail test
52. Elective Physical Training and Sports: Health-Improving Physical Activities – 328 hours, in-class work – 136 hours, pass-fail test

Elective disciplines (name, workload, final discipline assessment)

53. Physical Basics of Molecule Design – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
54. Digital Devices for Measuring, Control and Management – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
55. Optical Methods in Physical Chemistry – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
56. Chemistry of Natural Compounds – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
57. Practical Solutions in Chemical Engineering – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
58. Basics of Calculation of Heat-Exchange Equipment – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
59. Basics of Pharmaceutical Marketing – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
60. Management of Human Resources of Structural Unit – 3 credits (108 hours), in-class work – 36 hours, pass-fail test
61. Medicinal Products with Modified Release – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
62. Formulation of Medicinal Substances of Herbal Origin – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
63. Formulation of Pharmaceutical and Cosmetic Products – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
64. Generation and Application of Adsorbents Based on Waste from Pharmaceutical Production Units – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
65. Introduction to Pharmacology – 2 credits (72 hours), in-class work – 24 hours, pass-fail test
66. Biotransformation of Medicinal Substances – 2 credits (72 hours), in-class work – 24 hours, pass-fail test

Optional subjects (name, workload, final discipline assessment)

67. English Language from Scratch – 2 credits (72 hours), in-class work – 32 hours, pass-fail test
68. Intellectual Property Right in Production of Medicinal Products – 2 credits (72 hours), in-class work – 24 hours, pass-fail test

Practices (name, workload, final assessment)

69. Academic Practical Training: Production (Process Engineering) Practice – 3 credits (108 hours), graded test
70. Manufacturing Practice: Production (Process Engineering) Practice – 6 credits (216 hours), graded test

71. Manufacturing Practice: Scientific Research Work – 6 credits (216 hours), graded test

State final certification

72. Preparation for presentation and presentation of graduate qualification work – 9 credit (324 hours), GQW presentation

Resources Provision of the Degree Program

The bachelor's degree program in "Production of Pharmaceutical Products" is provided with learning and teaching documentation, as well as materials in all disciplines (modules) and practices, including electronic educational-methodical complexes posted in electronic information and educational environment of the University.

The University has facilities and resources that are in compliance with applicable fire safety rules and regulations and ensure all types of the disciplinary and interdisciplinary preparation, practical and scientific research works of students, provided for by the curriculum.

The list of facilities and resources, learning and teaching support, required for implementation of the degree program, includes the following: special rooms in the form of classrooms for conducting lecture-type activities, seminar-type activities, course work development (course work execution), group and individual tutorials, current control and midterm assessment. There are also rooms for independent work and rooms for storage and preventative maintenance of training equipment. Special rooms are equipped with designated furniture and teaching aids intended for presentation of teaching information to a large audience. Laboratories are equipped with laboratory equipment depending on the degree of complexity. Sets of demonstration equipment and illustrative study guides providing for topic-based illustrations and corresponding to discipline (module) programs, working educational programs of disciplines (modules), are offered for lecture-type activities.

Rooms for students' independent work are equipped with computer hardware with the possibility of connecting to the Internet network and access to electronic information and educational environment of the organization. Furthermore, students' independent work is arranged with the use of electronic resources of the University.

The library fund is provided with the required number of printed publications, moreover, there is an access to electronic library systems.

The University has the necessary licensed software package the composition of which is given in working programs of disciplines (modules) and is subject to annual update.

The students are provided with an access (remote access), including in the event of doing electronic learning, applying distance learning technology, to today's professional databases and inquiry and communications systems the composition of which is determined in working programs of disciplines (modules) and is subject to annual update.

During the whole period of studying every student and a teacher are provided for with an unlimited access (including the remote one) to electronic library systems and to electronic information and educational environment of the University from any place with the available Internet connection.

Electronic information and educational environment of the University provides for:

- the access to curricula, working programs of disciplines (modules), practices, editions of electronic library systems and electronic learning resources specified in working programs;
- recording of progress of the educational process, results of midterm assessment and results of the degree program completion;
- the formation of electronic portfolio of the student, including the preservation of student's works and grades for these works by any participants of the educational process;
- interaction between participants of the educational process, as well as synchronous and (or) asynchronous communication via Internet.

Functioning of electronic information and educational environment complies with the requirements of the legislation of the Russian Federation in the field of education and is provided for with the relevant means of information and communication technologies and qualification of the University employees who use and maintain it.

Staffing of the Degree Program

Implementation of the bachelor's degree program is ensured by the University teaching staff, as well as by persons engaged in the implementation of the bachelor's degree program under the terms of the civil contract.

Qualification of the teaching staff meets the qualification requirements specified in qualification reference books and professional standards. At least 60 percent of the teaching staff who take part in the implementation of the bachelor's degree program and of persons engaged in the implementation of the bachelor's degree program carry out scientific, teaching and learning, and (or) practical work corresponding to the profile of disciplines (modules) being taught.

At least 5 percent of the University teaching staff, taking part in the implementation of the bachelor's degree program and of persons engaged in the implementation of the bachelor's degree program, are managers and (or) employees of other organizations who carry out labor activities in the professional sphere corresponding to the professional activities the graduates prepare for and who have work experience in this professional sphere of at least 3 years.

At least 60 percent of the teaching staff of the University, and of persons engaged in the implementation of the bachelor's degree program, have an academic degree and (or) rank.

Uniqueness and Competitive Advantages of the Program

This degree program has a relevant focus on acquiring knowledge, abilities and skills in the production of pharmaceutical products and requirements of the good manufacturing practice that are able to ensure the production of medicinal products, as well as phytosubstances, in-process control of medicinal products and conditions of production including in the field of the development of new pharmaceutical products. It is achieved by including the following disciplines in the curriculum of this specialization: Formulation of Finished Medicinal Products, Chemistry and Formulation of Herbal Medicinal Products, Equipment and Basics of Design of Pharmaceutical Products Production Units, Organization of Production according to GMP.

The program has been created in cooperation with employers – pharmaceutical enterprises, namely: “R-Pharm” (Yaroslavl), JSC “Veropharm” (Belgorod), FSUE Saint Petersburg Scientific Research Institute of Vaccines and Serums of the FMBA of Russia (St. Petersburg), JSC WERTEKS (St. Petersburg), JSC “Pharmasyntez” (Irkutsk), and others that are involved in the educational process and are bases for carrying out 2 manufacturing practices for 8 weeks (in total), and also takes into account the current educational trends in the teaching and learning process: part of the studies within the teaching and learning process are held in the simulation center of SPCPU, the GMP training center completed with modern experimental-industrial equipment and a complex of modern cleanrooms with cleanliness classes K, D, C and provided areas with cleanliness class A.

The content of the program represents the needs of today's labor market and is developed taking into account the requirements in the field of production of medicinal products and contributes to solving the personnel problem of the pharmaceutical industry. A number of students of this specialization study within the target allocation by pharmaceutical enterprises JSC “Veropharm” (Belgorod), FSUE Saint Petersburg Scientific Research Institute of Vaccines and Serums of the FMBA of Russia (St. Petersburg), JSC “Pharmasyntez” (Irkutsk) and others. Graduates of the bachelor's degree program in field of education 18.03.01 Chemical Technology, discipline (specialization): Production of Pharmaceutical Products are in demand with engineering and production units, as well as quality control departments, quality assurance units of pharmaceutical enterprises.