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Chairman of the Advisory Council
Shadrikov V.D
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REPORT

on the results of the external evaluation of the educational programme Chemistry, «Organic and bioorganic chemistry» profile Bachelor's degree

Samara State Technical University (SamSTU)

Reviewers:
Dr. Korsakov M. K.
Dr. Lavrenov S. N.
Dr Raymond Wallace
Zaharova E.

Manager: Soboleva Erica

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SUMMARY OF THE PROGRAMME

The educational programme Organic and Bioorganic chemistry leads to the award of a Bachelor degree. The program is managed by Shadrikova Vera, the Associate Professor of the Organic Chemistry Department.

A site visit in a hybrid mode within the framework of the external evaluation of the programme was conducted by AKKORK experts in the period from April 12 to April 13, 2021.

1. Strengths of the programme:

1. The educational programme is provided with all the necessary materials and technical resources in accordance with the requirements of the educational standard and the requisites for all types of educational and extracurricular activities.
2. Within the framework of the programme, students and teachers are provided with a lot of information resources providing access to the leading search databases of chemical compounds and to scientific literature for the realization of educational and scientific activities.
3. For the implementation of the educational programme, a young, dynamically developing teaching staff, successfully combining teaching work with scientific activities is assembled. This is confirmed by the high publication activity and successful gaining of grants from research foundations, as well as by a favorable indicator of the average annual volume of research funding over the past three years.
4. The competencies of the programme graduates are highly appreciated by employers and confirmed in the process of the direct assessment of competencies. Most of the graduates are employed shortly after their graduation, work in their specialty at the enterprises of the region and report on the career development that meets their expectations.
5. There is a high level of satisfaction with the results of the programme on the part of employers and graduates. Most of the students also declare that the structure and content of the study programme meet their own expectations.

2. Weaknesses of the programme:

1. During the implementation of the programme, the relationship with employers has not been fully built. An insufficient activity of employers in the development of a matrix of students' competencies and in adjusting the programme in connection with the changing demands of the market can be seen. There is a low level of industrial partners' involvement in the creation of the final qualification work topics and in their implementation. Most of the final qualification works are fulfilled in the areas of scientific activity of the Chair of Organic Chemistry, as a result, there is a low correlation with practical-oriented tasks.
2. Means of feedback from students are not fully used, which are significantly required to obtain information for assessing the effectiveness of the educational process and for the implementation of constant adjustment and preventive actions.

3. There is a lack of awareness of the practice of university level chemistry teaching referenced against international standards. Much reliance is placed on the pass/fail concept rather than a graded approach to assessment. The oral examination, traditional in Continental Europe and beyond, figures highly in the assessment strategy and additional methods of assessment need to be explored.

4. There is no contingency planning in place for the effects of Covid-19.

3. Main recommendations:

1. It is recommended to expand the system of constant and systematic monitoring of students' satisfaction with all elements of the educational process (content of the study programme and curriculum, training schedule, learning and teaching materials, teachers' skills) and promptly use this information to take adjustment and preventive actions aimed at improving the educational process.

2. It is recommended to arrange internships in specialized Russian and foreign industrial enterprises (R-Pharm JSC, Pharmstandard JSC, Chemical Plant named after L. Ya. Karpov, Mendeleevsk, Bayer, Merck KGaA, Darmstadt) and in educational organizations for teachers involved in the study programme implementation.

3. It is recommended to analyse and clarify the competency matrix for its compliance with the relevant employers' requirements, as well as the compliance of students' competencies with those declared in the study programme.

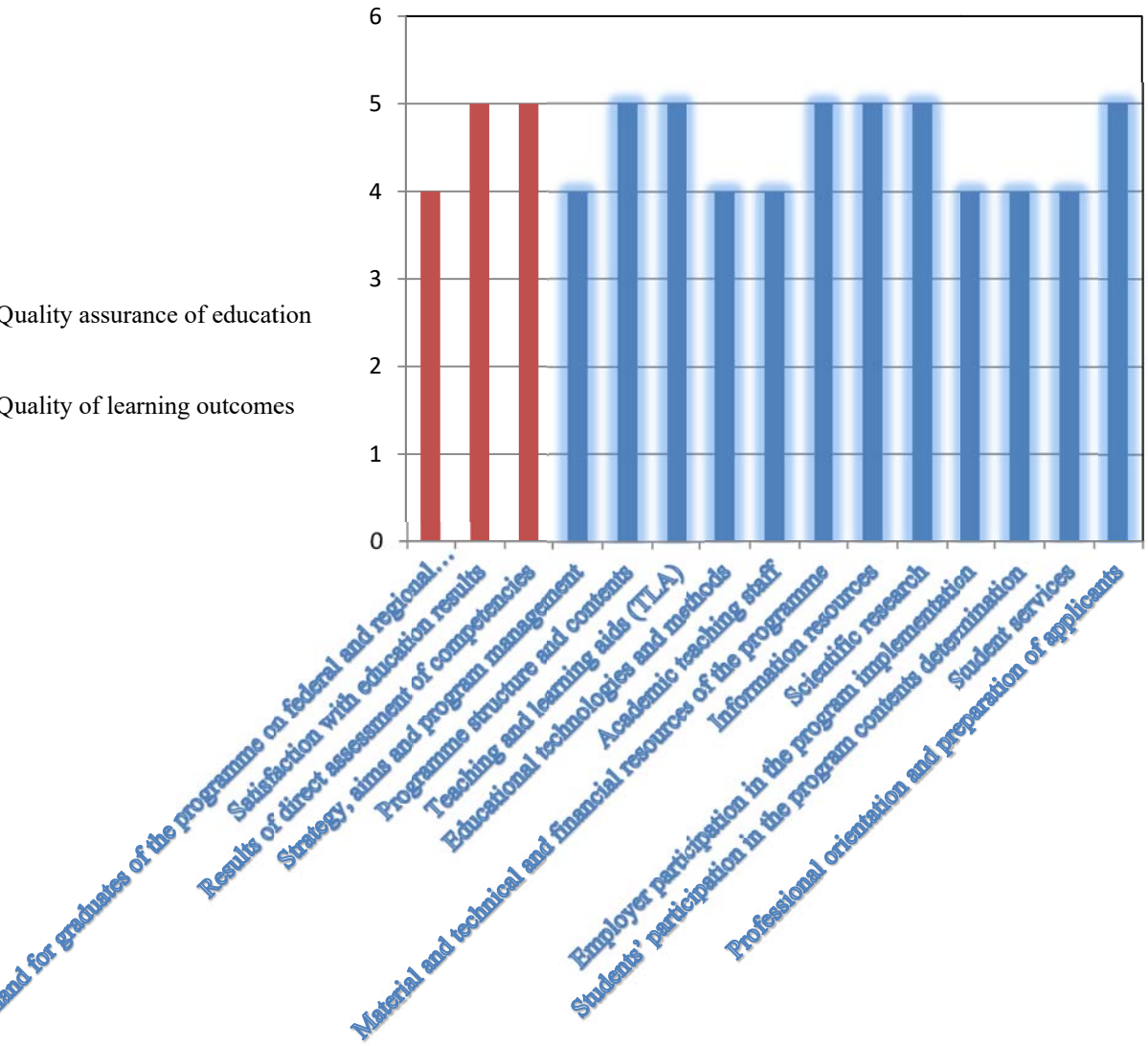
4. It is recommended to enhance collaboration with the existing partners – large regional employers (Kuibyshev Refinery JSC, Syzran Refinery JSC, Novokuibyshevsk Refinery OJSC, Samaraneftegaz JSC, KuibyshevAzot PJSC, Tarkett JSC, Ozon LLC, Samara Pharmaceutical Factory LLC) in the field of updating the competency matrix and programmes of the academic disciplines and creating topics for the final qualification works in core areas of the enterprises.

5. The importance of ongoing staff development and updating of curriculum content needs to be identified and consolidated in a designated 'staff and curriculum development unit' which is given high status within the Faculty.

Assessment profile of the learning outcomes and education quality assurance

№	Criterion		*Evaluation*
I	*Quality of learning outcomes*		
	1.	Demand for graduates of the programme on federal and regional labor markets	*good*
	2.	Satisfaction with education results	*excellent*
	3.	Results of direct assessment of competencies	*excellent*
II	*Quality assurance of education*		
	1.	Strategy, aims and program management	*good*
	2.	Programme structure and contents	*excellent*
	3.	Teaching and learning aids (TLA)	*excellent*
	4.	Educational technologies and methods	*good*
	5.	Academic teaching staff	*good*
	6.	Material and technical and financial resources of the programme	*excellent*
	7.	Information resources	*excellent*
	8.	Scientific research	*excellent*
	9.	Employer participation in the program implementation	*good*
	10.	Students' participation in the program contents determination	*good*
	11.	Student services	*good*
	12.	Professional orientation and preparation of applicants	*excellent*

Assessment profile of the learning outcomes and education quality assurance



QUALITY OF LEARNING OUTCOMES

1. Demand for graduates of the programme on federal and regional labor markets

Criterion assessment: good

Analysis of the role and place of the programme:

1. According to the data of the medium-term forecast of the staffing requirements of the Samara region economy by 2021 and until 2024 (Centre for Vocational Education of the Samara Region, https://www.cposo.ru/srednesrochnyj-prognoz-kadrovykh-potrebnostej), there is a ramp-up in the field of chemical and pharmaceutical industry. Despite the economic diversification tendency of the redistribution of employment to the service industry, most of the economically active population of the Samara region (22,8%) are employed in manufacturing enterprises. The largest investment projects in the Samara region are mainly related to the chemical industry (Kuibyshev Refinery JSC, Syzran Refinery JSC, Novokuibyshevsk Refinery OJSC, Samaraneftegaz JSC, KuibyshevAzot PJSC, Tarkett JSC) and to the pharmaceutical industry (Ozon LLC, Samara Pharmaceutical Factory LLC). The study of the demand for employees in the labour markets of the educational districts and region by 2021 and until 2024 shows that the annual forecasting demand (forecasted number of specialists) at chemical, pharmaceutical and petrochemical enterprises is increasing.

2. Graduates of the field of study Chemistry are in demand at chemical and pharmaceutical enterprises of the region, including Novokuibyshevsk Petrochemical Company JSC, Novokuibyshevsk Refinery PJSC, Novokuibyshevsk Oils and Additives Plant LLC, Novokuibyshevsk, Kuibyshev Refinery PJSC, TsSKB-Progress, Samara, Syzran Refinery JSC, Syzran, KuibyshevAzot PJSC, Togliatti, SIBUR Holding PJSC, Togliatti; as well as in Design and Research Institutes (Giprovostokneft JSC, Middle-Volga Research Institute of Oil Refining PJSC, Novokuibyshevsk, Electroshield GC CJSC, Samara, Retal JSC, Samara, MeKaMineft JV CJSC, Megion, FSBI “Privolzhskiy Territorial Administration for Hydrometeorological and Environmental Monitoring”, Samara, Samara Pharmaceutical Factory LLC, Samara, OZON LLC, Zhigulevsk, Volgamedsnab LLC, Samara, etc.).

3. According to the monitoring of the universities’ performance in 2019, the share of the SamSTU students enrolled in the Chemistry field, out of the students enrolled in this field in the region is 39%. The programmes of this field in the Samara region are implemented by three universities: “Samara National Research University named after academician S.P. Korolev”, “Togliatti State University”, “Samara State Technical University”.

Analysis of information indicators submitted by the higher education institution (conclusions):

1. The percentage of students combining study at the higher education institution with work in their specialization field – 10 %. The percentage is good, if we take under consideration high level of student's participation in the educational process.

2. The percentage of graduates who were employed in their specialization field within one year after their graduation from the university – 90 %. The percentage indicated the demand of graduates in the specialized enterprises.

3. The percentage of graduates who received job offers after their completion of production practice is of 2019/2020 – 10%, of 2018/2019 – 42%, of 2017/2018 – 38%. The value is quite high.

4. The percentage of students studying at the request of employers, for example, based on tripartite (target) agreements – 1 %. The low value does not directly reflect the demand of the programme's graduates and is mainly associated with the internal personnel policy of enterprises.

5. The percentage of graduates working in their specialization field within the region – more than 90 % for graduates of 2019/2020 and 2018/2019. 10% Of 2019-2020 graduates are unemployed because they have started their own business. The high value indicates significant demand for graduated at the specialized chemical enterprises of the region.

6. The percentage of graduates working in their specialization field outside of the region for graduates of 2019/2020 is 0 %, for graduates of 2018/2019 – 8,4 %, for graduates of 2017/2018 is increasing to 28,6 %. The growth of the indicator for the graduates of earlier ages reflects interregional mobility of the personnel and indicates the demand for graduates of the educational program at specialized enterprises in other regions and their competitiveness in the labor market.

7. Number of complaints on graduates – 0%.

8. There are no written positive reviews of organizations about the work of graduates at the university, but they were received orally at a meeting with employers during on site visit.

9. The percentage of university graduates in the educational programme in relation to the proportion of graduates of all other universities in the region in the educational program – 39 %, that, taking under consideration that Chemistry profile is implemented in three universities in the region, reflects the demand of the programme.

According to the results of the self-assessment conducted by the university, data on the distribution of the graduates are presented. Data presented by the university have been confirmed through examination of the relevant documents.

2. Satisfaction of consumers with learning outcomes

Criterion assessment: excellent

The percentage of employers who believe that the competencies of graduates of the programme are substantially compliant with the requirements for modern professionals in the industry is 100%. Data were confirmed during a meeting with employers, which the university's industrial partners attended:

Sitnicova Iana, Head of HR Department, CJSC JV MeKaMineft, Megion

Chemerskaia Iuliya, Head of Personnel development assessment Department, Kuibyshev Refinery JSC

Savelev Aleksei, Head of Head of Environmental Protection Department, Novokuibyshevsk Oil Refinery JSC

Employers confirm full satisfaction with the competencies of graduates of the programme.

Percentage of graduates who are fully satisfied with the learning outcomes:

Fully satisfied – 45,8%

Partially satisfied – 54,2%

Data were confirmed at the meeting with working graduates, which was attended by:

1. *Tikhonov Oleg, chemical engineer, CJSC JV "MeKaMineft"*
2. *Filatova Mariia, laboratory assistant of chemical analysis of the 5th category, PJSC "UEC Kuznetsov"*
3. *Starodubtseva Alina, JSC Kubyshevsky Oil Refinery, laboratory assistant*
4. *Iniakina Viktoriia, Samara Testing and Certification Center, laboratory engineer*
5. *Mikheev Mikhail, Laboratory Engineer, Production and Technical Department, LLC "MAXIMA"*
6. *Nikolaev Maksim, entrepreneur*
7. *Kazakova Anna, Leading Specialist of the Department of Standardization and State Ecological Expertise of the Department of Environmental Protection of the Ministry of Forestry, Environmental Protection and Nature Management of the Samara Region*
8. *Savostina Anna, LLC Firma Nectar, laboratory assistant controller*
9. *Aristova Uliana, engineer, SamTSU*
10. *Groshev Anton, engineer, SamTSU*
11. *Inozemtseva Natalia, engineer, SamTSU*

3. Direct assessment of competencies by reviewers

Criterion assessment: excellent

During the site visit, a direct assessment of 4th-year students' competencies was conducted. There were 8 4th-year students who participated in the direct assessment, which is 44% of the graduating class.

During the direct assessment of graduates, evaluation tools prepared by experts were used.

To analyze the development of competencies, the experts selected the following ones:

- Assessment of competences that characterize human qualities as an integral part of a person’s professional competence

UC-1. Ability to search, critically analyse and synthesize information, apply a systematic approach for solving the given tasks.

- Evaluation of direct assessment of social competences aimed at the development, maintenance and improvement of communication:

UC-3. Ability to interact socially and work in a team.

- Evaluation of direct assessment of professional competencies ("competencies nucleus") including competencies which reflect the demand (needs) of the federal and/or regional labor markets depending on the major employers of the graduates of the programme:

PC-1 (B-PC-1-n). Ability to select and apply technical means and test methods for solving research problems in the field of chemistry assigned by a more qualified specialist.

When carrying out the procedure for direct assessment of competencies, the experts used the case as an evaluation tool. Students were required to offer a solution to the problem in the hypothetic situation in the limited time (45 minutes). It was required to imagine themselves as a project manager of a company developing medical products, who received the task from a customer to develop technologies and put the pharmaceutical substance leflunomide into production. As part of the assignment, it was supposed to design development stages of the project, the sequence of actions, to suggest engineering solutions for the synthesis of the substance, development of a control strategy, transfer of technologies from a laboratory to production, as well as to provide a justification for the required research and engineering documentation. In the course of case-solving, it was allowed to use any available information. Students were divided into two teams, each of which was required to defend the project in front of the experts in the role of the customer and answer their questions. Questions were asked personally to each student, but in the absence of his answer, team members could participate in the answering.

As a result of the direct assessment of competence expert has revealed:

- 100% of students showed a sufficient level of ability to search, critically analyse and synthesize information (on the Internet in a case-solving situation), as well as to apply a systematic approach for solving the given tasks.

- The ability to interact socially and work in a team was demonstrated at a sufficient level by 70% of students, and at an acceptable level by 30% of students.

- 100% of students showed a sufficient level of ability to select and apply technical means and test methods for solving research problems in the field of chemistry assigned by a more qualified specialist.

Level / Students ratio	Sufficient level (have managed with 80% of the proposed tasks)	Acceptable level (the percentage of solved tasks from 50 to 79%)	Low level (percentage of solved tasks is less than or equal to 49%)
The results of direct assessment of competency that characterize the personality and that are an integral part of his/her professional competency			
100%	+		
The results of direct assessment of social competences aimed at the development, maintenance			

and improvement of communication			
70%	+		
30%		+	
The results direct assessment of professional competencies (“competencies nucleus”) including competencies which reflect the demand (needs) of the federal and/or regional labor markets depending on the major employers of the graduates of the programme			
100%	+		

When assessing the quality of education, experts reviewed 10 Graduate Qualification Works (GQWs), which was 100% of last year's GQWs in this field. The experts conclude that the reviewed GQW meet the requirements stated below as follows:

GRADUATE QUALIFICATION WORKS

№	Assessment criteria	Reviewers' comments
1.	Topics of GQW correspond to the field of training and the current level of development of science, engineering and (or) technology in the program field.	100 %
2.	Tasks and contents of GQWs are aimed at confirmation of formation of competencies of the graduate.	100 %
3.	Degree of use of the materials collected or received during the pre-degree internship and course projects in the implementation of independent research parts of the GQW.	100 %
4.	The topics of GQW are determined by the requests of industry organizations and the tasks of experimental activities, implemented by the teachers of the HEI.	100 %
5.	GQW results find practical application in industry.	100 % The results are used in the fine organic synthesis and pharmaceutical industries
6.	Degree of use of the research results of the Chair's, Faculty's and third-party research and production and / or research organizations in the implementation of independent research parts of the GQW.	100 %

4. Reviewers' recommendations and conclusions

Conclusions:

1. All employers who have participated in the survey and in the meeting during the on-site visit are satisfied with the results of the programme and believe that programme graduates’ competencies fully meet the requirements for present-day industry specialists. Graduates of the study programme are in demand on the labour market and are easily employed in the region.

2. Graduates of the study programme are totally or mostly satisfied with the learning outcomes. Most of them confirm that the level of training corresponds to the requirements that they faced in their professional occupation.

3. For some students and graduates, it is difficult to interact within a group in order to collectively solve a problem, which indicates an insufficient time devoted for social disciplines in the study programme curriculum.

Recommendations:

1. It is recommended to improve the study programme curriculum with the subjects of a psychological and pedagogical specialisation (Social psychology, Social pedagogy, Rhetoric) in order to create competencies aimed at the development, maintenance and improvement of communications. These are often referred to as 'soft skills' in Western pedagogy.

2. It is recommended to assess the level of the development of competencies among graduates of the study programme and to conduct analysis of the correspondence of this level to the competency matrix and current requests of employers (for example, to analyse the relevance and attainability of the B-UC-4.6 competence). To amend the competency matrix or the curriculum as appropriate.

Additional information:

Based on the results of the programme students' questionnaire survey, the educational organization (EO) provided data that were reviewed by the experts during the on-site visit. The data provided by the EO was confirmed by the experts as a result of the on-site visit.

This allows the experts to draw the following conclusions:

1. The structure of the programme fully or mostly corresponds to the expectations of the majority of students who took part in the survey (86%).

2. Among the most interesting subjects, the majority of respondents (86%) noted subjects related to chemistry (Analytical chemistry – 23% of respondents, Organic chemistry – 13%, Inorganic chemistry – 15%, General chemistry – 18%), which indicates that students' interests correspond to the specialisation of the chosen study programme.

QUALITY ASSUARNCE OF EDUCATION

1. Strategy, aims and program management

Criterion assessment: good

Strengths:

1. The educational organisation has formed a multi-level system with the distribution of areas of responsibility, which allows to effectively manage the study programme. In order to maintain the relevancy of the programme, the mechanisms were developed to engage employers to the programme management.
2. Directors of the programme analyse the programme, determine the tactics of its promotion and positioning its relevance and unique advantages in comparison with competitors. The analysis and updating of the programme is carried out on the basis of cooperation with employers, which ensures the consistency of the programme aims with the demands of the labour market. The university has independent departments for monitoring the quality of education, the results of which are freely available.
3. The study programme is characterised by high information accessibility – information about the programme is available on the university's website and in students' personal accounts in the electronic information and educational environment.
4. The study programme has a multi-level management system, including:

Educational Department, which functions include the following:

- full maintenance of learning and teaching documentation;
- technical support for the distribution of teaching load.

Department for Cooperation with Industrial Partners, which is responsible for the following:

- analysis of the labour market demands;
- interaction with enterprises on the organisation of educational internships for students;
- participation in the implementation of regional and federal programmes and projects related to the cooperation of the university and external stakeholders;
- monitoring and career support for graduates.

Supervising chair develops learning and teaching documentation and the syllabi of the disciplines, curricula and distributes teaching load according to the programme.

Dean's Office of the Faculty of Chemical Engineering supervises students' compliance with the proper education rules, changes of students' status, and the compliance of a class schedule with the syllabi of the disciplines and curriculum.

Recommendations:

1. It is recommended to design a strategy for the study programme development for a period of five years as a document. The strategy should be based on the prospects for the development of the regional and federal labour markets and industry tendencies in the field of study of this programme graduates. This strategy will make it possible to create a vision of the own services and position in the market, progress factors, risks and progress directions. At the same time, the strategy should be revised once a year based on the analysis and forecasting of the demands of the regional labour market for employees in

this area, taking into account the admission of students from other educational organisations.

2. The programme director is recommended to arrange internal training for teachers participating in the study programme implementation, in order to inform them about the aims of the programme, since according to the results of the questionnaire survey, 22,6% of teachers do not know anything about the study programme aims. This could be carried out by a 'Staff Development and Curriculum Unit'.

3. It is recommended to establish a system of further education for awarding students the qualification of a Chemistry Laboratory Technician within the framework of the study programme.

Additional information:

In the process of conducting the self-assessment, the educational organisation provided data on teachers' contentment with the personnel policy and current incentive programme. In the course of the on-site visit, interviews were conducted with the teachers taking part in the programme implementation.

Based on the results of the interviews, the experts conclude that teachers are satisfied with the current personnel policy and the system of performance-based contracts.

2. Programme structure and contents

Criterion assessment: excellent

Strengths:

1. The competence-based model of a graduate meets the requirements of the Federal State Educational Standard of Higher Education in the field of study Chemistry and the demands of the labour market. The competence-based model of a graduate contains in a balanced way competencies that characterise an individual's personal qualities, but are an integral part of his professional competence, competencies aimed at developing, maintaining and improving communications and competencies reflecting development of entrepreneurial skills and abilities.

2. Training in the programme is carried out according to the competence-oriented curricula, taking into account the requests of various stakeholders: the state, regional labour markets, social partners and students.

3. The curriculum of the study programme includes a sufficiently large number of various forms of training to develop graduates' professional competencies related to entrepreneurial skills and abilities to work in the field of small and medium-sized businesses: case-method teambuilding games, master classes of industrial partners, excursions and online-lectures of partner enterprises, independent work on the search and analysis of various competitions and grants, games for the development of creative thinking, self-presentations.

4. More than 60% of the GQW topics find practical implementation in the activities of enterprises and organisations, while more than 30% of the GQWs are in demand at small and medium-sized businesses.

Recommendations:

1. It is recommended to increase employers' engagement in the work on the structure and content of the programme to constantly update its content in response to changing demands of the labour market. It is possible to introduce modules into the content of the programme in accordance with the needs of major industrial partners of the region. For the work on the annual programme revision, it is recommended to create a council comprising the leadership of the programme on behalf of the educational organisation and employers' representatives on a permanent basis, and the active students.
2. It is recommended to increase the proportion of the GQW topics corresponding to the areas of activities of the region's industrial enterprises so that students can prepare for their future professional life and establish interaction with potential employers.

Additional information

During the site visit, experts held meetings with students and graduates of the evaluated programme. One of the issues discussed was the correspondence of the structure and content of the programme to the expectations of the direct consumers of the programs - students. Upon the results of the meetings, experts conclude that students and graduates are fully satisfied with the structure and content of the programme.

3. Teaching and learning aids (TLA)

Mark: excellent

Strengths:

1. The programme is provided with all the necessary teaching and learning materials, developed or harmonized together with employers on the basis of a practice-oriented approach. More than 80% contain test and evaluation tools based on real practical situations. Teaching and learning materials used in the educational process possess consistency and narration reasonableness of the educational content, sufficiency and quality of illustrations, methodological developments allowing to combine in-class and independent work. Materials used in the educational programme are freely available on the university website.
2. A plan is drawn up annually for the publication of teaching and learning materials. The decision on publication is made on the basis of the analysis of the disciplines provision with basic literature and with a priority to electronic forms of materials. The plan is reviewed at the university and is supposed to be externally reviewed by employers.
3. Some of the teaching and learning materials were developed within the framework of the interuniversity integrated platform of the electronic library system for joint use with "Samara National Research University named after academician S.P. Korolev" and "Ufa State Petroleum Technological University".

Recommendations:

It is recommended to establish partnership with academic and methodological associations. This might help to assess and adjust the methodical component of the materials.

Additional information:

During the on-site visit, it was found that most of the students believe that their opinion is not taken into account in the development and updating of teaching and learning materials. At the same time, in accordance with the regulations on the Academic and Methodological Council of the university, representatives of the Student Council may also be involved in the work of the Academic and Methodological Council. In this regard, the experts recommend the educational organisation to elaborate mechanisms for more accessible and open participation of students in the work on teaching and learning materials. For example, the programme director can arrange the involvement of active students in the review of teaching and learning materials to be published on the programme and in the assessment of current materials in order to plan their updating.

4. Educational technologies and methods

Mark: good

Strengths:

1. When implementing the study programme, the electronic information and educational environment of the university is used, which provides students and teachers an access to educational and scientific information.

E-learning, distance learning and modern digital educational technologies are used. A distance learning system has been developed with a constantly updated schedule, the ability to post teaching materials, assign individual and group tasks, and conduct a dialogue with students. At the same time, all training courses are implemented using platforms and e-learning tools. The number of electronic editions of teaching and learning materials is almost equal to the number of printed editions – 47 and 52 respectively.

2. The study programme is implemented using a wide range of educational activities, such as lectures, seminars, laboratory classes, problem-solving practical trainings, colloquia, individual consultations, tutorials, classes with the inclusion of business and role-playing games, team problem-solving activities, discussions, modeling real situations of professional activity, case methods, project work. Lectures with invited leading scientists and vacancy fairs from employers are also arranged.

Recommendations:

It is recommended to increase the involvement of employers in the coordination and implementation of technologies and methods used in the educational process. At a meeting with employers, the opinion was received that they do not take due part in the development of specialised innovative educational technologies. At the same time, their participation in this process is necessary for adequate preparation of students for their future professional activities. To update the programme, a working group can be

established, in which representatives of major employers of the region should be included on an ongoing basis.

Also, it is recommended the secondment of one or two employers for a short period –one or two months to the university so that they can understand what teaching is all about.

5. Academic teaching staff
Mark: good

Strengths:

1. The educational organisation has developed, approved and fulfilled the requirements for the qualifications and competence of teachers involved in the implementation of the programme, as well as standards and regulations that determine their teaching activities.
2. For the study programme implementation, a young, dynamically developing teaching staff successfully combining teaching work with scientific activities (100% of teachers) was assembled. This is confirmed by the high publication activity and successful gaining of grants from research foundations, as well as by a favourable indicator of the average annual volume of research funding over the past three years. More than 70% of teachers have practical experience in the field of the taught discipline ~~at the present time~~ or within the last three years.
3. The activities of the academic teaching staff undergo the annual independent assessment by the Department for Coordination of the University Development according to objective criteria. The results of the assessment are used to form a rating within the framework of the activity incentive programme – a system of performance-based contract. Most of the teachers (over 80%) are fully or mostly satisfied with the work of the performance-based contract system.
4. The university has created a training and retraining system allowing to maintain a set of competencies of the academic teaching staff, among which the most significant are the field of general professional competencies, competencies in the field of educational activities, competencies in the field of research activities, competencies in the field of methodical activities. Professional development of the teaching staff is carried out as required, but at least once every three years during the entire professional life on the semi optional courses with a volume of at least 72 academic hours. Among the teachers involved in the implementation of the programme, 64,5% have been trained in career development courses this year.
5. The university successfully implements the staff reserve policy. The main tool for working with a staff reserve is the Council of Young Scientists and Professionals (CYSP), which is a collegiate coordinating body for the development, practical implementation and control of research activities and a measurement system for financial support of students, post-graduate students and newly qualified scientists of the university who are actively involved in research activities. The number of teachers who were transferred to higher positions over the past year – 32%, and the number of those who left

the staff reserve – 4%, is a confirmation of the educational organisation's effective work with a staff reserve.

Recommendations:

1. It is recommended to arrange internships for teachers related to the core disciplines of the study programme at employers' enterprises (Ozon LLC, Togliattikauchuk LLC, KuibyshevAzot JSC, TogliattiAzot OJSC, Novokuibyshevsk Petrochemical Company JSC). This will improve qualifications in the field of modern production technologies and the labour market requirements for graduates.
2. It is recommended to intensify the involvement of students in the assessment of teachers' performance. Currently, monitoring to assess teachers' performance is carried out in accordance with the university's regulatory documents, but with too long a period – once a year. More frequent assessment, for example, in the form of a short monthly questionnaire survey, will allow a teacher and the programme director to expeditiously adjust educational process.
3. It is recommended to arrange internships for teachers in specialised foreign educational organisations for acquaintanceship and introduction of elements of best practices into the study programme.

Additional information:

Analyzing the facts presented by the educational organization in the self-evaluation report, the experts concluded that the data presented was relevant and reliable.

Based on the results of the analysis of the data presented, the experts conclude that implementation of the staff reserve policy in the educational organisation is highly effective.

As an improvement in the existing incentive programme, it is recommended to consider the inclusion of elements of non-financial motivation in its structure, for example:

- Joint development by the staff of a structural unit of a mission or objective which they want to achieve jointly. This should be done on the basis of the development strategy and/or development goals set by the faculty staff. For example, engaging at least two employers to update the content of professional competencies.
- Introduction of competitive elements into the structure of activity, for example, in the form of a rating system for assessing university's departments. The evaluation criteria for the rating generation can be results of scientific work, publication activity, proportion of international and inter-institutional cooperation, proportion of contract-based relations, indicators of extracurricular activities.
- Introduction of an additional further education system, which does not relate to the main study area of the programme as is free of charge for employees.

6. Material and technical and financial resources of the programme

Mark: excellent

Strengths:

1. The study programme is provided with all the necessary materials and technical resources in accordance with the requirements of the educational standard and taking into account the needs of all types of educational and extracurricular activities, including:

- classrooms, training and research laboratory facilities, necessary instruments;
- scientific and technical library;
- computers and multimedia equipment;
- licensed software, including specialised software;
- bases of internships on the basis of contracts with employers;
- social, sports and recreation infrastructure.

2. The programme is provided with a well-equipped laboratory of the Chair of Organic Chemistry, which are used to implement the educational process in specialised disciplines and conduct scientific researches.

3. Leading enterprises of the petrochemical cluster of the Samara region (Ozon LLC, Electroshield GC CJSC, Retal JSC, Giprovostokneft JSC, MeKaMineft JV CJSC, FSBI "Privolzhskiy Territorial Administration for Hydrometeorological and Environmental Monitoring", Samara Pharmaceutical Factory LLC, Middle-Volga Research Institute of Oil Refining PJSC, Volgamedsnab LLC) serve as centres for industrial practice, and their equipment fully meets the objectives of development of professional competencies and preparing for professional activity.

4. The financial resources of the programme formed from budgetary and extra-budgetary sources of the university's funding fully enable:

- to acquire, maintain and operate the material and technical facilities and equipment;
- to provide the educational process with highly qualified and competent teachers and staff members.

5. The directorship of the study programme carries out annual planning of incomes and expenditures in accordance with the established standards. The procedure for budget generation is regulated by the Regulation on planning and budgeting of financial and economic activities of the university.

Recommendations:

It is recommended to pay attention to the comprehensive organisation of inclusive educational environment in all buildings of the university to ensure the accessibility of education to persons with disabilities.

Additional information:

During the site visit, the experts interviewed the students and teachers participating in the program on their satisfaction with the quality of the classroom fund. The data received confirmed the results of a survey conducted by the educational organisation in preparation for the on-site visit and allow the experts to conclude that students (more than 65% of the respondents) and teachers (more than 80% of the respondents) are satisfied with the available material and material - technical base of the study programme.

7. Information resources
Mark: excellent

Strengths:

1. In the implementation of the study programme, a unified electronic information and educational environment of the university is used to ensure:

- organisation of educational activities;
- access of students and teachers, regardless of their location, to electronic information and educational resources through the use of information and telecommunication technologies and services;
- organisational and methodological maintenance of the educational process, including access to curricula, syllabi of disciplines, practical trainings and electronic educational resources specified in the disciplines syllabi, including resources of third-party electronic library systems available by subscription;
- information and analytical maintenance of the educational process, including documentation and monitoring of the educational process progress, the results of interim assessment and the results of mastering the study programme;
- possibility of conducting all types of classes and procedures for assessing learning outcomes, the implementation of which is provided with the use of e-learning and distance learning technologies;
- possibility of creation of an electronic portfolio of a student, including the possibility of saving a student's works, reviews and summaries of these works by any participants of the educational process;
- possibility of effective information interaction between participants of the educational process, including synchronous and asynchronous interaction via the Internet, in particular with the use of corporate e-mail.

2. Students and teachers are provided with access to international subscription electronic resources: databases Questel, Reaxys, Science online, Scopus, Web of Science, Wiley, CASC, journals of the American Chemical Society, journals of Cambridge university Press, Taylor and Francis, SAGE Publication.

Recommendations:

Based on the information received from students during the face-to-face meetings, it is recommended to arrange a computer class of free access in the building No. 2 (Kuibysheva str. 153) to provide each student with the opportunity to access information resources and work on educational assignments during his time at the university.

8. Scientific research
Mark: excellent

Strengths:

1. The implementation of the study programme is accompanied by intensive research activities carried out in the research laboratories of the Chair of Organic Chemistry. All students enrolled in the programme, within the framework of the

implementation of internships and final qualification works, as well as proactive participation in the activities of scientific project groups, take part in the scientific work of the chair, which is carried out according to the government mission and grants from the Russian Science Foundation and Russian Foundation for Fundamental Research.

Students are involved in scientific activities from the moment they enter the university, through compulsory participation in practice-oriented projects as part of the introductory practice in the 1st year. They select project topics and a scientific advisor, conduct theoretical and experimental researches. The best projects are recommended for participation in youth scientific conferences within the university and in other educational organizations. In 2019, 50% of the programme students took part in conferences, in 2020 – 30%. To stimulate scientific activity, it is practiced to include students in research teams for the implementation of scientific and research grants.

2. The results of intellectual activity obtained in the course of scientific work of students and teachers at the Chair of Organic Chemistry are of practical importance and find practical application by concluding licensing agreements with business entities for the transfer of rights to use inventions (for the period 2018-2019, two agreements were concluded).

Recommendations:

The executive staff of the Chair of Organic Chemistry is recommended to arrange a specialised conference on chemistry of the all-Russian or international level. The significant results of research activities achieved by the chair allow the university to declare them in the professional chemical community. Involvement of students in the conference organisation and participation can become an additional element of the study programme for the development of the declared competencies and preparation for professional life.

Additional information:

In the documents on self-assessment, the educational organisation provided information on the results of monitoring students' opinions "The impact of research work on the quality of education". According to the survey, the number of students who believe that the quality is improving is 70,1%, the quality remains unchanged – 11,9%, were unsure – 16,4%. The experts concluded that the data obtained confirm the interest of students in scientific and research activities due to its appropriate organisation by the chair.

The engagement of students in scientific project groups was considered. For students of the assessed programme, the educational organisation provides 16 scientific project groups, each of which is assigned to a certain teacher. The examples of titles-subject areas of project teams are the following:

1. Dearomatization of highly polarized five-membered heterocycles as a new methodology for organic synthesis;
2. Synthesis of new chiral ligands for asymmetric complex catalysis based on aracemic framework vicinal diamines;

3. Low molecular inhibitors of the E5 ion channel – a new protein target of the human papillomavirus;

4. Tandem "Multicomponent synthesis/reductive rearrangement of 2-acyl-2,3-dihydrofurans as the basis for a new methodology for the derivation of polyfunctional 4H-pyrans;

5. Transformation of sterically hindered epihalohydrin analogues;

6. Oxidative decomposition of dihalogenadamantanes in the creation of structurally diversified libraries of biologically active compounds;

7. Reactions of cycloaddition of o-methylene quinones with polarized olefins;

8. Reactions of addition to ortho-quinone methides as a key to flavonoids and condensed 4H-pyranes.

9. 1,3-Disubstituted 2-oxaadamantanes as a molecular platform for structurally diverse multifunctional heteroframework systems;

10. Pericyclic reactions involving 4H-chromenes as a new method for the construction of polycondensed oxygeneous heterocycles;

11. Chiral Michael adducts in stereoselective synthesis of non-aromatic heterocyclic systems;

12. Dearomatization of highly polarized five-membered heterocycles as a new methodology for organic synthesis;

13. Terminal-disubstituted sterically hindered 2-butenes in the construction of carbo- and heterocyclic systems;

14. Efficient design of ion channel inhibitors (+) - RNA of genomic viruses based on saturated framework heterocycles.

The main purpose of organising scientific project groups is to develop the university's scientific potential by attracting newly qualified researchers. Among students who regularly attend scientific project groups, 100% is represented by the programme students. Based on the results of activity in scientific project groups, students participate in the publication of scientific articles, patents, theses and registration of packages of application documents for submission for grants of scientific foundations. In 2020, 24 scientific publications involving students in the authoring team and indexed in the Web of Science and Scopus were published in Russian and foreign journals.

9. Employer participation in the program implementation

Mark: good

Strengths:

1. The educational organisation's policy assumes variability of employers' participation in the educational process within the framework of the following forms of interaction:

- membership in state examination boards;
- carrying out a review of a study programme for compliance with the current requirements of the labour market;
- reviewing of students' final qualification works;

- engaging industrial partners' representatives to teaching activities as external part-timers;

- guidance in the practical training of students within the framework of industrial practice.

The industrial partners of the educational organisation are all major employers of the region that are relevant for the educational programme: SIBUR Togliatti LLC, Rosneft Oil Company PJSC, Togliattikauchuk JSC, RETAL JSC, Electroshield GC CJSC – TM Samara, Giprovostokneft JSC, OZON LLC, Samara Pharmaceutical Factory LLC. Over the past three years, employers have held 22 events as part of the educational process under the study programme.

2. At the study programme level, cooperation with Lukoil West Siberia LLC, Ozon LLC and Novokuibyshevsk Refinery JSC was organised in the field of conducting industrial practice and vacancy fairs for graduates.

Recommendations:

It is recommended to expand cooperation with employers in the field of the competency matrix adjusting. At the face-to-face meeting, employers' representatives confirm their non-involvement in the process of designing a competency matrix, although they are the main consumers of the results of its development and implementation in the learning process. It is necessary to create a working group to improve the study programme, with the obligatory inclusion of large employers (Kuibyshev Refinery JSC, Syzran Refinery JSC, Samaraneftegaz JSC, KuibyshevAzot PJSC, Tarkett JSC, Ozon LLC, Samara Pharmaceutical Factory LLC, Togliattikauchuk LLC, Togliattiazot OJSC) for the annual analysis of the development and updating the requirements for graduates' competencies in accordance with the demands of the industry.

Additional information:

The self-evaluation report of the educational institution provides information on the results of a survey of employers on their satisfaction with the quality of graduates' training.

At the same time, employers noted that maturity of graduates' competencies is estimated at 4 and 5 points on a five-point scale. These results were confirmed in the course of the face-to-face meeting with employers' representatives. This allows to draw conclusions about employers' satisfaction with the quality of the development of competencies.

10. Students' participation in the programme contents determination:
Mark: good

Strengths:

1. The university has several students feedback mechanisms :

- through an annual questionnaire survey to identify satisfaction with the education quality, the quality of the study programme, quality of conditions and organisation of

training process, conditions for extracurricular activities, and to assess the quality of teaching;

- by interacting with students within the framework of mentorship;
- through the functioning of special sections of the university website (ask a question to the vice-rector for academic affairs, ask a question to the rector).

Feedback from students can be used to improve the actual learning outcomes and increase the education quality assurance by replacing a course teacher, introducing new disciplines or adjusting the programmes of the implemented disciplines, changing the number of hours per discipline, introducing additional consultations, making changes to the subject matter of the course or thesis themes, replacing specialised organisations for internship, changing training formats.

2. It is envisaged to encourage students for their participation in determining the content of the programme and organising the educational process: incentive payments for members of the Student Council and Trade Union Committee of the faculty and for students who have distinguished themselves in educational and extracurricular activities.

Recommendations:

It is recommended to intensify students' involvement in the processes of assessing the educational process organisation and teachers' activities. Currently, monitoring to assess the educational process is carried out in accordance with the university's regulatory documents, but with too long a period – once a year. As a result, 19,4% of students believe that they cannot influence decision-making on the organisation and management of the educational process, and 31,3% of them found it difficult to answer in the affirmative about the possibility of such influence. More frequent organisation of assessment procedures by the director of the study programme from students side will allow a teacher and director of the programme to expeditiously adjust the educational process, and students will see the result of their participation in monitoring. As part of the programme implementation, it is necessary to define a strategy of continuous quality control with the involvement of students based on the anonymity principle.

Additional information

During the site visit, the experts analyzed the participation of students in the student self-government bodies and scientific workshops.

This allowed the experts to make a conclusion about students' high social activity and their involvement in specialised scientific and research activities.

11. Students' services on a programme level

Mark: good

Strengths

1. The Department of Social and Educational work is responsible for the organization of extracurricular activities. It coordinates all areas of educational work: civil, spiritual and moral, military and patriotic, sports, cultural and leisure.

2. The university has a Student Trade Union Organisation and a Student Council, at the meetings of which relevant issues affecting the interests of students are discussed. Representatives of the Trade Union Organisation and student councils participate in the work of the academic councils of faculties and the Academic Council of the university, scholarship commissions, in considering issues on the allotment of trip tickets to recreation centres and sanatorium-preventorium.

3. Students have equal rights to a higher academic scholarship for achievements in research, social, cultural and artistic and sporting activities. The university encourages students by paying personal scholarships. The rector's scholarships and scholarships of the academic councils of the faculties have been established. Having good academic performance allows students to transfer from paid education to free one upon the availability of places.

4. The university has a system of material support for students:

- annually, as a reward for achievements in educational and extracurricular activities, more than 400 university students receive subsidized tickets to Crimea, Sochi, St. Petersburg, and more than 800 students receive subsidized tickets to the "Politekhnik" and "Stroitel" recreation camps;
- more than 2000 students receive financial assistance for various reasons;
- students have the right to reimburse the cost of the PCR analysis for Covid-19;
- students living in cities and towns in the Samara region are entitled to social support for financing transportation by transport of suburban and interurban intraregional connection, carried out using the funds of the regional budget in the amount of 50% of travel costs for eight trips per month during the academic year;
- students have an opportunity to receive free meal tickets in the university's canteens;
- students receive free tickets to the university's sanatorium-preventorium.

5. Students are given the opportunity to undergo additional training under the programmes "Interpreter in the field of business communication", "Industrial safety", "Oil and gas production operator".

Recommendations:

It is recommended to create a public space in the building No. 2 (Kuibysheva str. 153), in which the allocated space will be used for learning, communication and leisure of students. This space can be connected to the computer class of free access to provide each student with the opportunity to access information resources and work on class assignments during his time at the university.

12. Professional orientation and preparation of applicants

Mark: excellent

Strengths:

1. Applicants guidance is organised using a large number of approaches and is carried out in several directions:

- “Open Doors Day” at which enrollees and their parents receive information regarding the specifics of admission to the university, documents required for admission, the number of state-funded places on the study programme (in 2020, three events were held).

- Regular excursions to the academic buildings and chairs, where students receive detailed information about the study programme, academic teaching staff and equipment used both for research activities and for the implementation of study programmes.

-Online-working with schoolchildren via video conferencing and communications through social networks (Vkontakte, Instagram).

- The training system “School – University” is implemented on the basis of the Architectural and Technical Vocational School of SamSTU (natural science specialisation with in-depth study of chemistry, physics and mathematics).

- At the premises of the university, the events of the All-Russian Festival Science 0+ are organized.

- In 2018 and 2019, the scientific and educational event All-Russian Chemical Dictation was organised on the basis of the Faculty of Chemical Engineering.

2. The Samara Mendeleev School (SMS), a project of the Faculty of Chemical Engineering, which voluntary carries out training of talented schoolchildren of grades 8-11. The training is an advanced study of separate branches of chemistry. Enrollment to the School is based on the results of the admission testing, which determines the most prepared and enthusiastic candidates. In 2020, 83 schoolchildren of grades 9-11 were enrolled in the School. More than 50% of the SMS students enter the university after grade 11.

3. Since 2019, within the framework of the national project “Education – Success of Every Child”, a centre for the development of modern competencies “House of Scientific Collaboration (HSC)” has been functioning at the university.

4. The “Lyceum of SamSTU” functions on the basis of the university. The technical training programme at the “Lyceum of SamSTU” in the 2020-21 academic year is implemented in two specialisations: engineering with in-depth study of mathematics, physics and computer science (67 people are trained), and natural science with in-depth study of mathematics, physics and chemistry (29 people are trained).

5. The university’s teaching staff are directly involved in the work of engineering and technical classes (Rosneft-class of Rosneft Refinery PJSC). These classes serve to improve the level of enrollees’ training, as well as for assistance to schoolchildreb in choosing a profession and adapting them to the conditions of study at the university.

6. The university arranges the preparation of schoolchildren for the Unified State Exam (USE) in mathematics and physics. Attendees of the preparatory courses are provided with methodical literature to prepare for the USE in the corresponding subjects of a course.

CURRICULUM VITAE OF REVIEWERS

REVIEWER: Korsakov Mikhail

Place of work, position	Director of the Center for the Transfer of Pharmaceutical Technologies named after M.V. Dorogov Federal State Budgetary Educational Institution of Higher Education "Yaroslavl State Pedagogical University named after KD Ushinsky"
Academic degree, academic title	PhD in chemical sciences
Additional titles, degrees	Professor of the Russian State University. A.N. Kosygin
Education	Higher in the specialty "Chemistry"
Professional achievements	Certificate of honor of the Ministry of Science and Higher Education of the Russian Federation for significant achievements in the field of education and many years of conscientious work
Research interests	Search and development of new medicines
Practical experience in the direction of the programme subject to assessment	20 years of work and management of a research center in the field of organic chemistry

REVIEWER: Lavrenov Sergei

Place of work, position	Senior Researcher, Laboratory of Chemical Transformation of Antibiotics, Federal State Budgetary Institution "NIINA", Russian Academy of Medical Sciences
Academic degree, academic title	кандидат химических наук
Additional titles, degrees	PhD in chemical science
Education	
Professional achievements	
Research interests	
Practical experience in the direction of the programme subject to assessment	

REVIEWER: Dr Raymond Wallace

Place of work, position	Fellow of the Royal Society of Chemistry (UK)
Academic degree, academic title	Dr., Chartered Chemist, CChem Chartered Scientist (CSci)
Additional titles, degrees	External expert at the University of Plymouth (UK), external expert, consultant at the University of Malta (ECTN expert)

Education	
Professional achievements	Royal Society of Chemistry Education Division HE Teaching Award; Invited Plenary Speaker at several international conferences
Research interests	Chemical Education
Practical experience in the direction of the programme subject to assessment	

REVIEWER: Elena Zakharova

Place of work, position	National Research Technological University MISiS, Master's degree, 22.04.01
Academic degree, academic title	-
Additional titles, degrees	-
Education	Higher, Bachelor's degree, 22.03.01
Professional achievements	Grant under the program "UMNIK", winner of the conference "Days of Science" "MISIS", participation in scientific conferences, registration Know-how
Research interests	Nanopowders of transition metals and their oxides
Practical experience in the direction of the programme subject to assessment	4 years