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REPORT

on the results of the external evaluation of the educational programme Chemistry, Physics and Mechanics of Materials "Functional, structural materials and nanomaterials," profile Bachelor's degree

Samara State Technical University (SamSTU)

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SUMMARY OF THE PROGRAMME

The Bachelors's degree programme Chemistry, Physics and Mechanics of Materials, "Functional, structural materials and nanomaterials" profile is implemented by the Department of General and inorganic chemistry, and allows awarding a Bachelor's degree. The program is managed by Ekaterina Egorova, the Associate Professor, Chair of General and Inorganic Chemistry.

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

Strengths of the programme:

1. According to personal assessments, data from the self-examination report, reviews of employed graduates of the program, and employers, experts note that the programme maintains an optimal balance between theory and practice. As a result of training, amount of knowledge and practical skills acquired is sufficient for work. At the same time, students develop the necessary personal qualities, such as sociability, teamwork skills, decision-making skills, and the desire for self-improvement in professional activities. Graduates of the program show mobility, easy adaptation when applying for or moving to another job, including employment in another region, and are ready to work in related specialties. Graduates of the programme are prepared to receive the following levels of education based on their knowledge and skills, which creates the prerequisites for a free choice between working at an enterprise and scientific activity.
2. Graduates of the programme demonstrate that their level of training meets the requirements of the labor market, that does not need additional training; as well as quick involvement in the production process; good business qualities: initiative, mobility, ability to develop, ability to conduct business conversations; high personal qualities: quick adjustment in a team, the ability to act in a co-operative spirit, knowledge and compliance with ethical standards in a multicultural environment. Experts also note the good integration of employers in the educational process, including through involvement in the development of the topics for graduation theses.
3. Experts agree with the opinion of the university teachers about the good rating system of chairs and employees created at the university, which motivates for work and gives the opportunity to find the optimal balance of educational and scientific activities.
4. Experts noted the high information security of the educational programme due to the organization of effective access to contemporary scientific databases, domestic and foreign literature databases, providing a current level of communication and computerization.
5. The university's classroom fund, scientific laboratories, library, canteen, auxiliary infrastructure, and the surrounding area are in excellent condition. The university has created a barrier-free environment for people with disabilities.

Weaknesses of the programme:

1. Insufficient equipment of the scientific laboratory facilities. The chair does not have modern scientific instruments. At the same time, the procedure for accessing the common use center is not well established. For the full-fledged forming of professional competencies, it is necessary to have a practical acquaintance with various methods of material analysis. Students need practical skills to work with modern equipment.
2. The main development area of the material and technical resources of the educational programme is to increase the number of methods and modern devices for studying the properties of materials. In the near future, it is advisable to develop conditions for more active interaction of the chair with the center for collective use and with other chairs on the issue of experimental study of various properties of materials using state-of-the-art analytical equipment.
3. Insufficient metrological study of the graduation theses.
4. Insufficient variety of scientific areas of the programme.

Recommendations:

1. As a result of the analysis of the educational program and taking into account the feedback of working graduates, experts believe that the following discipline should be added to the program:

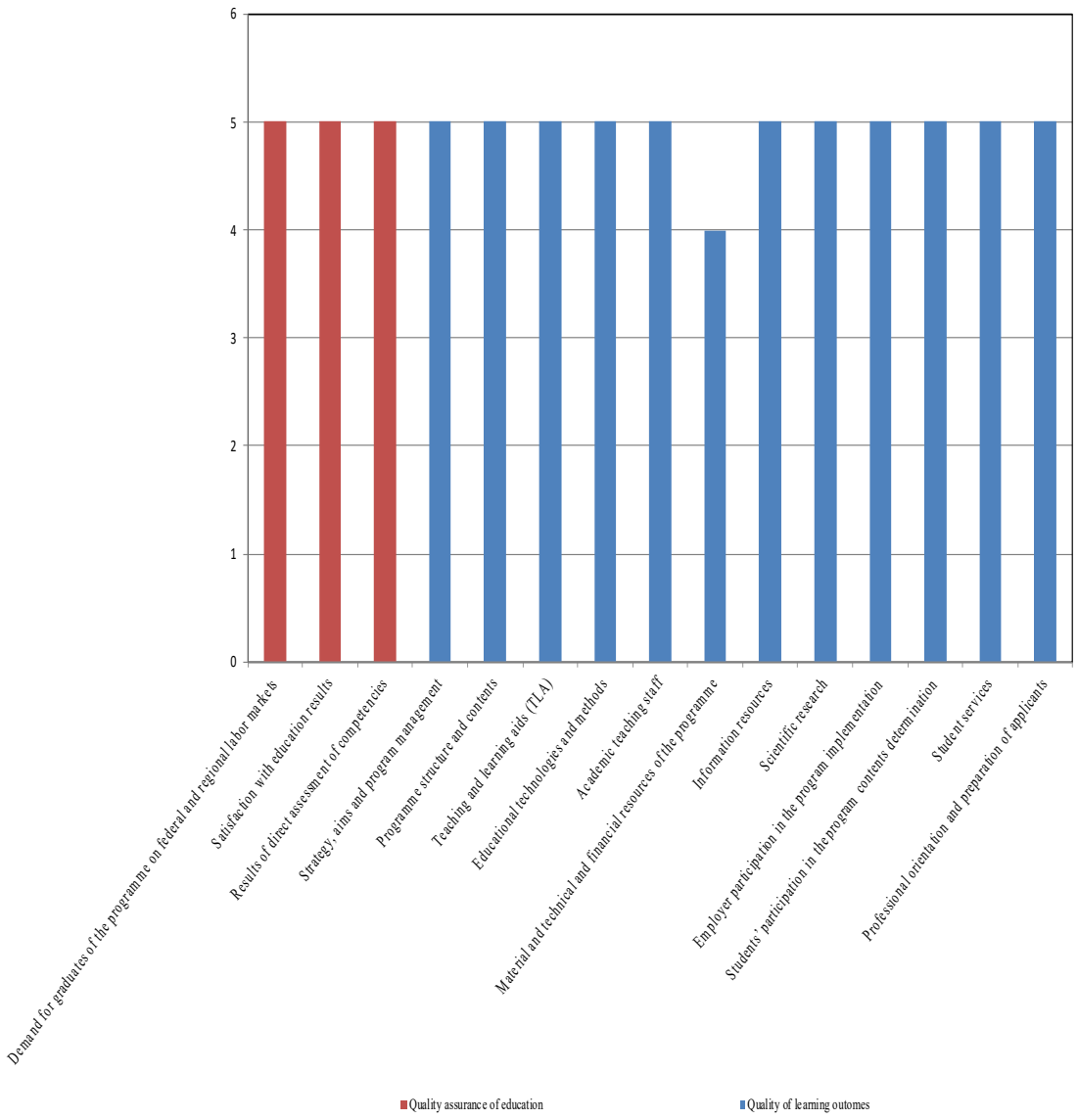
- metrology (knowledge of GOST standards and other regulatory documents, knowledge and ability to prepare scientific and technical reports in accordance with the regulatory rules). Inclusion of a discipline dedicated to the problems of metrology in the program will allow students to familiarize themselves with the basics of the metrological service of the Russian Federation, to form skills and abilities for the use of regulatory documentation in the professional field.

2. Experts believe that it is necessary to strengthen the research part of the programme. In particular, to diversify the topics of the graduation theses, to strengthen the instrumentation, to make more active use of the common use center and interaction with other chairs in terms of conducting experimental research.
3. It is advisable to increase the variety of topics of scientific works performed at the chair, which will improve the professional training of students. This can be achieved by bringing in new methods of materials and process research.
4. It is necessary to supplement the programs of disciplines devoted to the methods of studying materials, with new sections in accordance with the research methods used.
5. Based on the wishes of working graduates, experts believe that it is necessary to strengthen the skills in the practical mastering of Excel, Mathlab, Compass/AutoCAD programs within the relevant courses, and increase the volume of the Organic Chemistry discipline.

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	*excellent*
	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	*excellent*
	2.	Programme structure and contents	*excellent*
	3.	Teaching and learning aids (TLA)	*excellent*
	4.	Educational technologies and methods	*excellent*
	5.	Academic teaching staff	*excellent*
	6.	Material and technical and financial resources of the programme	*good*
	7.	Information resources	*excellent*
	8.	Scientific research	*excellent*
	9.	Employer participation in the program implementation	*excellent*
	10.	Students' participation in the program contents determination	*excellent*
	11.	Student services	*excellent*
	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
Mark: excellent

Analysis of the role and place of the programme

1. The region's need for graduates in this field (etc. existence and charecteristics of the core enterprises providing bases):

The programme "Physics, Chemistry, and Material Mechanics" provides for the training of bachelors in the field of "Functional, structural materials, and nanomaterials". Currently, specialists in this area are widely in demand in both the federal and regional labor markets. According to Irina Donnik, Vice-President of the Russian Academy of Sciences, the profession of a chemist will be one of the most popular professions in the coming years. According to the largest Russian Internet recruitment company HeadHunter (HH), bioengineer, bio-pharmacologist and bio-information scientist will be considered among the most promising professions in the next 10 years. Work in these areas is closely related, among other things, to the chemical profile of training specialists who have professional competencies in the field of organic, inorganic, and analytical chemistry. The profession of a chemical technologist is considered promising and in demand, including in the Region, since production technologies are necessary for industries, such as pharmaceuticals, food production, metal mining, plastics, detergents, etc.

According to the resource data of the Trud.com, at the moment, there are 636 vacancies of the "chemist" specialty in Russia. For 20.9% of open vacancies, employers indicated a salary of 18.8+ thousand rubles, 19.2 % – a salary of 25.8+, and 14.2% – a salary of 39.8+ thousand rubles. According to HH, there are currently 2,085 chemist vacancies in Russia, of which 47 are in the Samara Region. Of these, for 25 vacancies, the income level is indicated from 20 thousand rubles, for 19 – from 30, for 15 – from 35, for 11– from 40, and for 8 – from 45 thousand rubles.

The survey of graduates has shown that on average (for three years of graduation) for 14.7% of respondents, the average salary immediately after graduation was from 35 to 45 thousand rubles. At the same time, at the time of the survey, 11.6% of graduates' salaries already exceeded 45 thousand rubles.

The educational program graduates working in the Region are employed by the enterprises, such as CJSC JV Himprom, LLC SamaraNIPIneft, JSC Kuibyshev Oil Refinery, JSC Giprovostokneft, LLC Plant of Instrument Bearings, JSC Kuznetsov, JSC LUKOIL, JSC Novokuibyshev Oil Refinery, as well as in other regions – employed by CJSC JV Mekamineft (Megion city, Khanty-Mansi Autonomous District).

2. Educational policy of regional (municipal) governments:

The regional policy in the field of education is determined by the Decree of the Government of the Samara Region No. 6 of January 21, 2015 (as amended on March 24, 2021) "On approval of the state programme of the Samara Region "Development of education and improving the effectiveness of the implementation of youth policy in the Samara Region" for 2015-2024".

According to this document, personnel support for the socio-economic development of the region is provided by creating a flexible system of vocational education: creating an optimal network of vocational education institutions focused on the needs of various segments of the labor market of the Samara Region; coordinating the activities of the vocational education system according to the prospective personnel needs of employers, employers' involvement in the development and implementation of targeted training programs; increasing the attractiveness of vocational education programs; improving the professional level of teachers; developing university and academic science, which contributes to improving the quality of students' training and solving the problems of innovative development of the Samara Region; stimulating scientific research in priority areas of regional clusters (aerospace, petrochemical, medical, etc.) aimed at further commercialization of research results.

The average salary of teachers and Master of Industrial Training of professional educational organizations, as well as teachers and researchers of educational organizations of higher education subordinated to the Ministry of Education and Science of the Samara Region is increased to the level and within the time limits specified by the Decree of the President of the Russian Federation No. 597 "On measures for the implementation of state social policy".

A unified educational environment has been created in the Samara Region, and a unified approach to financing the industry is being implemented based on normative per capita financing.

3. Characteristic of the competitive environment in this field (number of universities, that prepare specialists in this field, and their characteristics (status, property, number of students) ect.):

In Russia, as of 2021, in total, 12 universities are teaching in the field of 04.03.02 "Chemistry, physics and material mechanics". This training field is listed 155th in the rating of specialties according to the Vuzoteka.ru website.

In the first place (according to the rating of universities) is the Lomonosov Moscow State University. In 2020, the number of budget vacancies in this specialty amounted to 25. The second place is taken by St. Petersburg State University (10 vacancies). Samara State Technical University is in sixth place.

In the Region under consideration, training in the field of 04.03.02 is conducted only at SamSTU.

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

The percentage of students combining study at the higher education institution with work in their specialization field:

There are no students combining study at the higher education institution with work in their specialization field.

The percentage of graduates who were employed in their specialization field within one year after their graduation from the university:

Within last three years on average about 81,5% of graduates find a job in their specialization field.

The percentage of graduates placed on business applications:

Within last three years on average about 21,8% of graduates received job offers after their completion of production practice.

The percentage of students studying at the request of employers, for example, on the basis of tripartite (target) agreements:

Currently, one target learning agreement has been concluded.

The percentage of graduates working in their specialization field within the region:

81,5% (average for the last 3 years).

The percentage of graduates working in their specialization field outside of the region:

7,5 % (*average for the last 3 years*)

Number of complaints on graduates:

0%

Number of positive reviews:

There are three positive reviews on the work of graduates.

The percentage of students within the programme enrolled in the Master's degree programme who have completed Bachelor's programme:

2 out of 20 (10%). 2 graduates of 2017-2018 studying years enrolled in Master's degree and then in postgraduates study.

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:

100%. SamSTU is the only university in the region teaching students in this specialty.

Additional information:

Graduates' distribution data was provided according to the results of self-evaluation conducted by the educational institution. The data provided by the educational institution was verified during the study of 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 program:*
  - are substantially compliant with the requirements for modern professionals in the industry – 0%
  - mostly meet modern requirements for professionals in this industry with minor deficiencies – 100%
  - there are few graduates whose competencies meet modern requirements for professionals in this industry – 0%
  - do not meet the requirements for professionals in this industry 0%

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

Due to the results of the questionnaire survey of graduates, 30.2% of graduates are completely satisfied with the actual learning outcomes, and 69.8% are mostly satisfied.

Meanwhile, 39.6% of graduates believe that the level of training of specialists at the university fully meets the requirements of the labor market. 47.2% of graduates believe that the level mostly meets the requirements of the labor market. 13.2% of graduates found it difficult to answer.

The surveyed graduates noted a lack of computer skills (20.7% of respondents), skills in organizing and planning work (16.9% of respondents) and self-presentation skills (15.1% of respondents).

3. Level of competence development of a graduate

Criterion assessment: excellent

The direct assessment of competencies of graduates was conducted during the on-site visit. The direct assessment of competencies of graduates was conducted during the on-site visit. Third-year students (10 students), representing 44 % of the graduating course, participated in the direct assessment.

In order to analyse the development of competence the expert chose the following one:

- Evaluation of direct assessment of competency that characterize the personality and that are an integral part of his/her professional competency:

The UK-4 s capable of carrying out business communication in oral and written forms in the state language of the Russian Federation and in a foreign language(s).

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

The OPK-2 is capable of conducting experiments on the synthesis and analysis of chemicals, studying reactions, processes and materials, and conducting the diagnostics of physical and mechanical properties of materials in compliance with safety standards.

- 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:

The PK-3 is able to optimize and implement the main technologies for obtaining advanced materials.

The measurement and control materials developed by the experts were used during the procedure of direct assessment of graduates:

Example of test tasks:

1. Do you participate in scientific conferences?
2. Are you involved in projects, round tables, and exhibitions?
3. Including communicating in these activities in a foreign language?
4. Do spectral methods of chemical composition analysis refer to chemical methods of analysis?
5. What are the methods for analyzing the chemical composition of a substance?
6. Is it correct to pour acid into water or vice versa?
7. Is the dissolution of salt in water a chemical process?
8. Does oxygen belong to the main types of functional materials?
9. How is the least-squares method used to process experimental data?
10. What computer programs exist for processing experimental data?
11. What material properties can be determined from the state diagram?
12. Briefly describe your research work.

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

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			
70 %	+		
30 %		+	
-			-
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			
80 %	+		
20 %		+	

-			-

When assessing the quality of education, experts reviewed 10 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.	5 %
5.	GQW results find practical application in industry.	23 %
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:

Direct assessment shows a high level of competence formation among students.

Research training is a major weakness in the quality of learning.

Recommendations:

1. It is recommended to strengthen the research part of the program: to diversify the topics of the graduation theses, and to increase the list of methods and devices for studying the material properties. Currently, the topic of the graduation theses is based on the use of two research methods: calorimetry and X-ray phase analysis. The most typical topic of the graduation theses is: "Investigation of the Li, K, Ba || F, Br system, and

measurement of the melting enthalpy of functional compositions". The implementation of research, based on IR and Raman spectrometry, various methods of elemental and functional spectral analysis, electron microscopy, methods for determining the specific surface area of materials, etc. will allow diversifying the topics of the graduation theses, and qualitatively improve the material science training of students.

2. The university administration is recommended to develop conditions for more active interaction of the chair with the common use center and other chairs concerning the issue of conducting experimental studies using high-precision devices.

3. The programs of disciplines devoted to methods of studying materials, should be supplemented by sections devoted to new research methods implemented into the practice of students' research work.

4. It is recommended to add the following subjects to the program of disciplines: Psychology of interpersonal relationships and Metrology.

5. It is recommended to strengthen practical skills in the development of processing programs, such as Excel, Mathlab, Compass/AutoCAD; as well as to increase the scope of the Organic Chemistry discipline.

Additional information:

Based on the results of the student survey, the educational organization presented the data, which were verified by reviewers during the site visit. The data provided by the HEI were confirmed by the reviewers.

QUALITY ASSURANCE OF EDUCATION

1. Strategy, aims and program management

Mark: excellent

Strengths:

The programme's strengths are its defined development goals and directions.

Goals:

1. staffing of priority industrial sectors of the region;
2. developing personal competencies and professional skills of students, allowing graduates to successfully self-actualize in various fields of activity;
3. updating the main areas of materials science development to meet the needs of students and employers;
4. training in methods of synthesis and research of the materials properties, including nanoscale, as well as training in digital technologies for the development of functional materials.

The program development directions:

– the educational environment is the basis for research, innovation, and subsequent entrepreneurial activity of students and teachers;

– implementing new forms of the educational process, namely, conducting project and research work in the environment of interdisciplinary teams in current scientific and technological areas;

– developing the training system, working with the students' requests, involving practitioners and scientists in the training process;

– increasing the list of industrial and academic partners, activating network interaction, developing the activities of the scientific and educational center Engineering of the Future;

– forming a single space for working with students to select the most qualified applicants.

Recommendations

Closer interaction with employers: organizing practical training in the workplace, increasing the number of research works, including graduation theses, at the request of enterprises, attracting specialists from enterprises to conduct various types of classes, developing uniform requirements for graduates by employers.

This will improve the adaptation of graduates to work in production.

Additional information

During the site visit, the experts interviewed students, teachers, employers and received data that allow the experts to conclude that the data provided by the educational organization are relevant and reliable.

2. Programme structure and contents

Mark: excellent

Strengths

The program implements the competence model of the graduate, which is a tool to form knowledge, skills, and abilities according to professional standards. The implemented competencies take into account the needs of the regional labor market.

The program contains competencies that form the student's personal qualities and communication activity. The competence model of the program contains competencies aimed at developing entrepreneurial skills.

Taking into account the opinions of all interested parties is being conducted.

Recommendations

It is recommended to supplement the program with a discipline dedicated to interpersonal interaction that will allow students to develop their personal communicative competencies at a higher level.

The inclusion of a discipline dedicated to the problems of metrology in the program will allow students to familiarize themselves with the basics of the metrological service of the Russian Federation, to form skills and abilities for the use of regulatory documentation in the professional field.

Practical development of computer processing programs will allow for more efficient and high-quality work in both the scientific and industrial spheres.

Extending knowledge in organic chemistry increases the employment opportunities of graduates in the Region and insures faster adaptation in the workplace.

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 alumni are fully satisfied with the structure and content of the programme.

3. Teaching and learning aids (TLA)
Mark: excellent

Strengths:

The teaching materials were developed by the academic staff of the Chair according to the teaching and learning aids standard of the discipline and agreed with the representatives of the scientific community. Teaching and learning aids are developed mainly based on theoretical material, as well as based on real practical situations and ideas of employers.

Teaching and learning aids provide conducting various types of classes. Assignments for the industrial and pre-graduate practice training are focused on forming students' practical skills for conducting scientific work.

The program is fully equipped with textbooks, teaching aids, laboratory-based practicals, methodological, reference, and regulatory materials. The university has created

a digitized library fund, and offers unlimited access to databases corresponding to the content of the program's disciplines.

Recommendations:

Since the latest textbooks were released by the Chair in 2017, it is recommended to systematically edit, update and supplement the teaching and learning aids with up-to-date information in the field of training.

This can be implemented both in the form of new textbooks, collections of design assignments, laboratory-based practicals, and methodological recommendations, and in the form of revised and extended editions of previous years.

Additional information:

During the site visit, the experts analyzed the testing and assessment materials that are used by the educational organization for the current control of progress. This allowed the experts to make a conclusion about the compliance of the developed assessment tools with the tested competencies.

4. Educational technologies and methods

Mark: excellent

Strengths:

During the four-year training, classes are held in the following formats: lectures, laboratory sessions, workshops on problem-solving, seminars, colloquiums, term papers, research papers, individual tutorial instructions, and training. At that, contemporary methodologies are used, namely, business and role-playing games, organizational and activity games, group problem work, discussions, brainstorming; analysis of real situations of professional activity, case method, project-based method, and master classes.

All training courses are implemented using e-learning platforms and tools. The University implemented the possibility of mastering educational programmes directly at the place of student’s residence is provided, as well as joint full-time and online training using distance educational technologies.

This contributes to improving the quality, efficiency, and continuity of the educational process.

Recommendations:

To develop an individual approach to education and, in particular, to control and measure materials. This can be achieved by forming a bank of questions for each discipline, from which a test or examination card is randomly selected for each student individually.

Additional information:

Based on meetings with students, graduates, teachers and employers, experts make a conclusion that the data provided by the educational organization is relevant and reliable.

5. Academic teaching staff
Mark: excellent

Strengths:

The educational process involves teaching staff whose qualifications comply with the Regulations of SamSTU. Election to the academic position is conducted once every five years on a competitive basis. The academic staff is assessed annually. Each teacher is trained in advanced training courses every three years. The university regularly conducts a survey of teaching staff for internal monitoring of the organization's activities.

The university has a fairly well-thought-out system of stimulating teaching activities, based on a rating assessment. Bonuses and incentive payments are provided.

Availability of academic degrees of the teaching staff employed in the program meets the requirements of the Federal State Educational Standard 3++. The Chair implements an individual approach to the formation of employment in the educational and scientific processes, depending on the requests and capabilities of the teacher.

Recommendations:

The reserve for the development of the entire university's activities with regard to the teaching staff is the improvement of the teacher motivation system since more than 40% of teaching staff expressed partial or complete dissatisfaction with this criterion. Programme heads are encouraged to review the process of competency assessment of teaching staff and take into account the results of the educational process and scientific work.

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.

6. Material and technical and financial resources of the programme
Mark: good

Strengths:

The implementation of the program is provided by:

- the university classroom fund, which is in excellent condition;
- educational laboratory base of the Chair, which is also in excellent condition;
- the existing SamSTU instrument fleet;
- the scientific and technical library of SamSTU, which includes a large digitized collection of literature, unlimited access to a large number of databases, and individual computer equipment;
- developed and implemented electronic information and educational environment of SamSTU;
- computer park and multimedia equipment of SamSTU;
- availability of licensed software in SamSTU, including specialized software;
- availability of a practices platform in specialized organizations;

- sports, recreation and social infrastructure of SamSTU, taking into account the needs of people with disabilities.

This complex of material and technical resources allows carrying out successfully all types of educational and extracurricular activities.

Reccomendations:

The main development direction of the material and technical resources of the educational programme is to increase the number of methods and modern devices for studying the materials properties. At the earliest possible time, it is advisable to develop conditions for more active interaction of the Chair with the common use center and other chairs on the issue of experimental research of various properties of materials using state-of-the-art analytical equipment.

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 obtained data allows the experts to conclude that the interviewees are satisfied with the quality of the classroom fund.

7. Information resources

Mark: excellent

Strengths:

The university has created and uses unified electronic information and educational environment for implementing the programme. Which is used in the educational process. This environment enables the organization of educational activities, organizational, methodological, and information-analytical support of the educational process, as well as access of students and employees, regardless of their location, to electronic information and educational resources; conducting classes, evaluating and recording learning outcomes; interaction between the educational process participants.

Students and teachers have access to the electronic collections of SamSTU and libraries of other universities, Russian-language and foreign scientific and scientometric resources, available on the library's website. The archive of scientific publications of the university is open to the public.

Each student has a multifunctional personal account, which reflects personal data, the entrance test results, current academic performance, the results of participation in various events, information about scientific and practice-oriented works, as well as employment.

The electronic labor exchange is available.

Reccomentaions:

It seems advisable to increase the number of databases with reference data, for example, spectral databases, databases for phase analysis, phase diagram databases, etc..

8. Scientific research
Mark: excellent

Strengths:

The University has research laboratories and research centers that are accessible to students and project teams. Scientific activity at the University consists of participation in grant competitions and programs, implementation of business contracts, preparation of scientific publications, and holding various scientific events for students.

The Chair of General and Inorganic Chemistry conducts scientific research in the following areas: simulating phase-transition functional materials; synthesizing and studying physical and chemical properties of optical luminophores; analyzing the effectiveness of salt formation inhibitors according to their chemical composition; constructing 3D models of multicomponent dependences of the magnetic properties of substances depending on their structure; searching for conduction channels in the structure of ionic compounds; and studying the structure of organometallic frameworks. All teachers conduct scientific work. The results are published in scientific journals, presented at conferences, and confirmed by patents and certificates of conformity.

All the research results, including the graduation theses are used in the education activities when preparing lectures, laboratory, and practical classes in professional disciplines, as well as conducting practices and preparing graduation theses.

Students take part in scientific activities by mandatory participation in practice-oriented projects, even during their first year of studying. Also, students throughout the entire period of training are engaged in scientific circles, participate in conferences, exhibitions, competitions, prepare publications of scientific results.

Reccommedations:

It is advisable to increase the variety of topics of scientific works performed at the Chair, which will improve the professional training of students. This can be achieved by using new methods for studying materials and processes, such as electron microscopy, spectral methods for analyzing the elemental composition and functional groups, methods for studying the specific surface area and porosity, and particle size analyzers.

Additional information:

The information on the results of monitoring students' opinions "The impact of research work on quality” was provided in the self-evaluation report. The obtained data allows the experts to conclude that the interviewees are satisfied with the quality of the classroom fund. The experts concluded that the data presented are relevant and reliable.

9. Employer participation in the program implementation
Mark: excellent

Strengths:

The experts note close cooperation with employers and the participation of employers' representatives in the implementation of the programme. Employer

representatives are members of the state examination commissions. An expert examination of the educational program for compliance with the contemporary requirements of the labor market is carried out with the involvement of employers in the development of the professional competencies of students. Employers provide project assignments that can be implemented by students within the framework of the graduation theses and participate in the review of students ' works. Employers provide funding for work based on business contracts and grants. Representatives of industrial partners are involved in teaching activities as external part-timers. Some of the Chair teachers are employees of organizations whose activities are related to the profile of the bachelor's degree program being implemented. Students' practical training takes place at employers' sites under the guidance of their representatives. Based on the internship results, students receive an invitation to work at enterprise.

Recommendations:

More attention should be paid to the involvement of employers in forming students' universal and communicative skills. This will allow graduates to adapt faster and easier to the working conditions at enterprises. To develop these competencies, it is possible to introduce courses aimed at developing the skills of organizing and planning work, self-presentation, and business correspondence. It is recommended also to teach students how to present the material.

It is recommended to hold meetings with programme graduates who have recently got a job or worked at the company for some time, with students of various years of study. This will help first-year students to form an up-to-date idea of further employment.

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 meetings held employers noted that graduates have well-formed professional competencies.

10. Students' participation in the program contents determination

Mark: excellent

Strengths:

Students' opinions are taken into account to assess the organization of educational activities at SamSTU. This concerns teaching and learning aids for each discipline and program in general, as well as the quality of educational resources for independent work.

Recommendations:

As a result of studying the document on self-examination, it can be concluded that it is necessary to put the work on attracting student self-government bodies to the implementation of the educational process on a systematic level, as well as to increase the number of meetings of the faculty and University administration with students for their

involvement in the management of the academic activities of the faculty, and to resolve the issues raised.

Additional information:

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

The experts concluded that the data presented are relevant and reliable.

11. Student services on a programme level
Mark: excellent

Strengths:

Availability of financial support mechanisms for students, such as trips to sports and recreation camps, various bonuses and financial assistance, payment of travel privilege on rail and road transport, organization of hot inexpensive meals in student canteens, payment for a health resort treatment, targeted payments to students from among orphaned children, etc. Students can receive social and psychological support from specialists (for example, on problems related to stress, abandonment of bad habits, etc.).

Recommendations:

To provide students who need learning assistance due to a disability or chronic illness with services, such as voice recognition software, hearing aids, or lecture and seminar notes, etc. which will increase the number of students.

Additional information:

The experts concluded that the data presented are relevant and reliable.

12. Professional orientation and preparation of applicants
Mark: excellent

Strengths:

To work with applicants, the University has created a center for professional orientation, pre-university programs, and the organization of students' admission. During the academic year, several Welcome Days are held. Tours to the University's academic buildings and the chairs are held regularly, as well as online work with schoolchildren is carried out through social networks and video conferences. Pupils of grades 8-11 are welcomed to attend the Samara Mendeleev School for in-depth study of certain sections of chemistry. Based on SamSTU, the specialized SAMMAT Olympiad in mathematics, included in the list of the Ministry of Science and Higher Education of the Russian Federation, which is held annually. Every year, the University hosts a scientific and technical conference "Days of Science". One of conference sections, namely, Chemistry and Life, is aimed at attracting schoolchildren. Besides, works are underway on the Vzlet (Ascent) programme.

A system of continuing education is being implemented. Thus, a Lyceum affiliated at the SamSTU provides training in technical and natural sciences. University teachers participate in the activities of engineering and technical classes.

Within the framework of the University, senior schoolchildren are prepared to pass the unified national exam (UNE) in mathematics and physics, as well as the applicants for internal entrance tests in the same subjects. All students of the preparatory courses are provided with methodological literature on preparing for the UNE in the relevant subjects.

Recommedtaions:

To work more actively with foreign applicants to increase the number of foreign students by conducting Olympiads, tests, competitions among schoolchildren in various countries.

Additional information:

The experts concluded that the data presented are relevant and reliable.

CURRICULUM VITAE OF REVIEWERS

REVIEWER: Ella Dzidziguri

Place of work, position	National Research Technological University MISiS (representative of the academic community), Associate Professor
Academic degree, academic title	Doctor of Technical Sciences (Physicochemical Research of Metallurgical Processes)
Additional titles, degrees	-
Education	Higher
Professional achievements	14 study guides, 114 scientific articles
Research interests	Materials science, nanomaterials, methods of research of processes and materials
Practical experience in the direction of the programme subject to assessment	37 years

REVIEWER: Mikhail Fedotov

Place of work, position	Russian Academy of Sciences, Junior Researcher
Academic degree, academic title	Ph.D. (Technical Sciences
Additional titles, degrees	-
Education	Hiegher, Moscow State Technical University named after N. E. Bauman.
Professional achievements	Participation in international scientific conferences, including abroad. Grant under the UMNIK program. Execution of work within the framework of state assignments and business contracts Participation as a co-executor in the programs of the Presidium of the RAN and OKHNM RAN
Research interests	Nanopowders of metals and their oxides, colloidal solutions
Practical experience in the direction of the programme subject to assessment	10 years Performing research works in chemistry and materials science

REVIEWER: Prof. Dr. Jiri Barek

Place of work, position	President of the Department of Analytical Chemistry of the Czech Chemical Society, Editor-in-Chief of the Chemické Listy magazine (Czech Republic), Head of the

	UNESCO Center for the Study of Trace Elements at Charles University in Prague, Head of the UNESCO Laboratory for Environmental Electrochemistry at Charles University in Prague (Czech Republic)
Academic degree, academic title	Dr. of chemical science, Professor
Additional titles, degrees	-
Education	Hiegher
Professional achievements	More than 500 publications on analytical chemistry in peer-reviewed journals, co-author of 6 monographs on the analysis and destruction of chemical carcinogens, author and co-author of 17 chapters in monographs on electroanalytical methods, author of 3 teaching aids, Hirsch index - 40
Research interests	Electrochemical determination of trace amounts of biologically active organic substances, for example, chemical carcinogens, biomarkers, drugs and their metabolites, pesticides, dyes and intermediates in the dyeing industry
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