Approved

Chairman of the Advisory Council

_____ V. Shadrikov

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REPORT

on the results of the external evaluation of the educational programme Energy and resource-saving processes in Chemical technology, Petrochemistry, and Biotechnology, "Environmental protection and rational use of natural resources" profile Bachelor's degree

Samara State Technical University (SamSTU)

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SUMMARY OF THE PROGRAM

The educational programme of higher education is implemented in the field of Energy- and resource-saving processes in chemical technology, petrochemistry and biotechnology, profile "Environmental protection and rational use of natural resources" by the Chair of Chemical Technology and Industrial Ecology and leads to the award of a Bachelor's degree. The programme is managed by the Rector of SamSTU, Doctor of Technical Sciences, Professor Dmitry Bykov.

A visit of a hybrid fromat (site/online) 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

On the basis of the information provided by the HEI, the data obtained during the site visit, the experts report that the program is timely updated and meets the current demands of the labor market.

The programme is updated through the inclusion of new academic disciplines and practices and is focused on the development of a variable practice-oriented component and appropriate educational activities corresponding to the educational needs of students (strategic objectives of SamSTU in terms of modernization of educational activities).

Based on the analysis of the programs, the EP is annually reviewed and approved by the Academic Council of the University. The objectives of the EP are aligned with the labor market demands. This is confirmed by the fact of direct involvement of employer representatives in the development and implementation of the program.

The evaluated educational program has several advantages and strengths which include the following:

1. The availability of facilities and resources that provide disciplinary and interdisciplinary training. These include specialized rooms, which are classrooms for lecture-type classes, seminar-type classes, course project design, group and individual counseling, current assessment, and interim certification, as well as rooms for independent work, and rooms for storage and preventive maintenance of educational equipment. Rooms are equipped with specialized furniture and technical training tools serving to present educational information to a large audience.
2. High competitiveness of the program in the labor market and substantial interest from applicants, SamSTU is one of the few educational organizations in the Volga Federal District of Russia implementing such a programme.
3. Advanced educational technologies, namely, project-based learning methods, practice-oriented methods of work on information platforms and with the use of software installed in employer organizations, and gamification methods are used in the training process.

4. As part of the development of the strategic project "Territory of Life", in 2018, for the first time, SamSTU consolidated educational, research, design and development, and production activities in the field of environmental safety of the region.

5. Systematic and active career guidance aimed at attracting students from different regions of the Russian Federation. The educational program provides an inclusive component for people with disabilities.

Weaknesses of the programme

1. Leak of involvement of the teaching staff and students in international academic mobility (lack of joint publications with leading foreign scientists, joint scientific projects, presentations at international scientific conferences).

2. Lack of focus on international technological practices applied in various fields of industry.

3. Specialists of the Chair and students are focused exclusively on solving regional industrial problems, while not being conversant in environmental and energy problems of the country and the world.

4. The educational program does not provide for the study of special disciplines aimed at acquiring knowledge about global environmental challenges, international practices in solving these problems based on the principles of sustainable development.

5. The full-text databases, such as ScienceDirect, Springer, and Web of Science are used in the educational and research process insufficiently.

Main recommendations

1. To use interactive types of training sessions more widely when delivering lectures: lectures delivered by two lecturers at the same time; blended learning, to use MOOCs (Massive open online courses) in relevant disciplines, located on leading Internet platforms. It is necessary to expand the methods and forms of evaluation of Master students, focusing on evaluating specific learning outcomes (case studies, project development, model development, etc.).

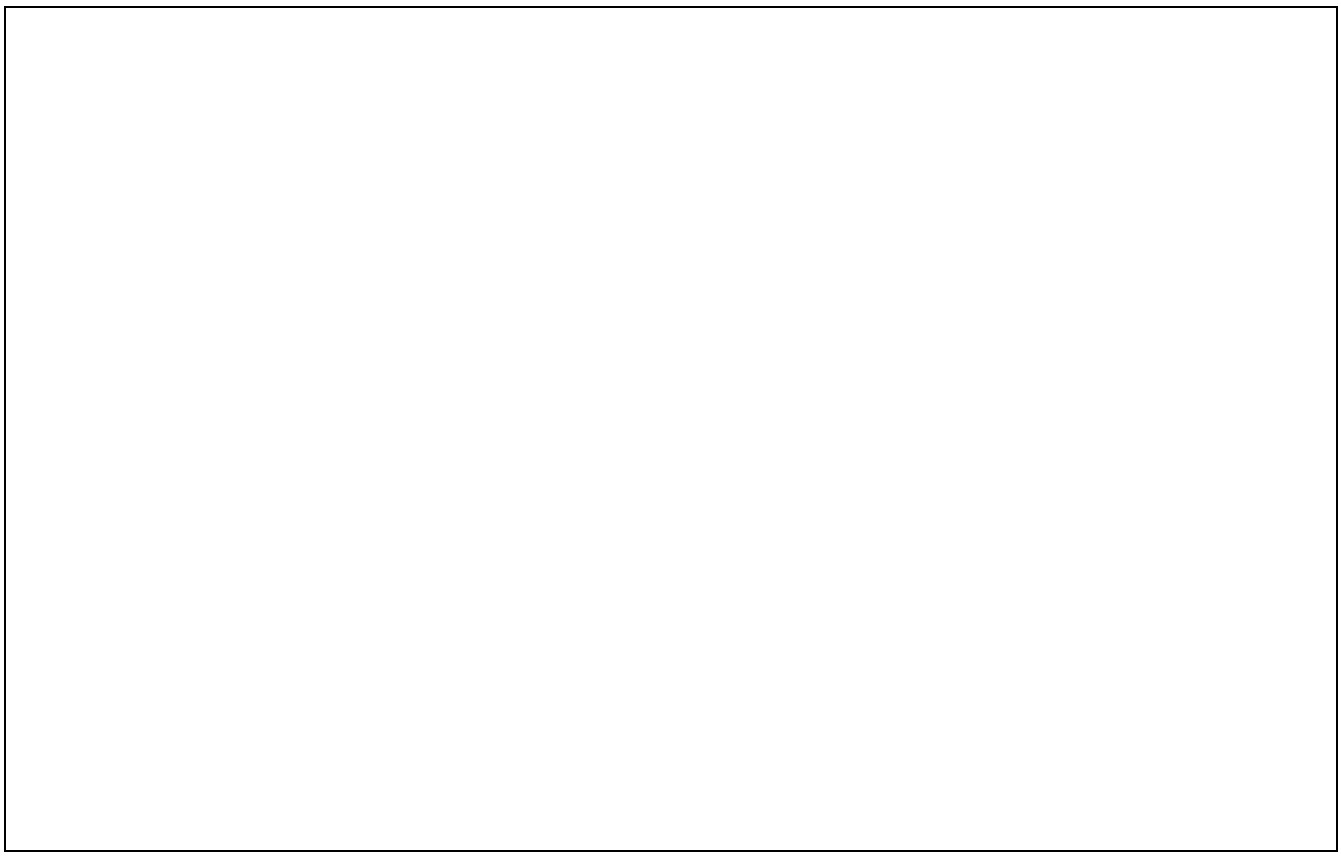
2. To integrate the educational programme into the international environment, it is necessary to focus on a broad range of academic mobility: to attract leading specialists from advanced universities of the world to teach and double-supervise graduate works, implement joint international grants, organize joint programs, ensure academic mobility of students (within the framework of European Erasmus + programs), organize summer and winter schools with foreign universities. To increase the proportion of teaching staff taking part in scientific conferences in the country and abroad as invited (plenary) speakers, to reflect this indicator in the system of incentives for the employee of the educational program. To put defense of the graduation thesis in English and other foreign languages into practice

3. To consider the possibility of implementing disciplines covering global environmental challenges into the educational program, as well as to use international experience in solving them based on the principles of sustainable development. Involve international organizations in the implementation of the educational program.

4. To conduct explanatory work with students concerning more detailed acquaintance with the concept of the programme, the importance of foreign language proficiency as a communicative tool for knowledge transfer, as well as a tool to increase their opportunities in the labor market.

Assessment profile of the learning outcomes and education quality assurance

No.	Criterion		Assessment
I	*Quality of the learning outcomes*		
	1.	Demand for the graduates of the program on the labor market	*good*
	2.	Satisfaction of all consumers	*excellent*
	3.	Results of direct assessment of competencies	*good*
II	*Quality assurance of education*		
	1.	Strategy, aims and program management	*good*
	2.	Program structure and contents	*excellent*
	3.	Teaching and learning aids	*excellent*
	4.	Educational technologies and methods	*excellent*
	5.	Teaching staff	*excellent*
	6.	Material, technical and financial resources	*excellent*
	7.	Information resources	*excellent*
	8.	Research work	*good*
	9.	Employers' participation in the program implementation	*excellent*
	10.	Students' participation in the program content determination	*excellent*
	11.	Student services	*excellent*
	12.	Career guidance	*excellent*



QUALITY OF THE LEARNING OUTCOMES

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

Criterion assessment: good

Analysis of the role and place of the programme:

Despite the trends of economic diversification – the redistribution of employment to the service sector – the majority (22.8%) of the economically active population of the Samara Region is employed by manufacturing enterprises. The largest investment projects in the Samara Region are mainly related to the chemical industry (Kuibyshev Refinery, Syzran Refinery Plant, Novokuibyshev Refinery, Samaraneftegaz, KuibyshevAzot, and Tarkett). The study of human resources needs in the labor markets of educational districts and the region in whole, has shown that the annual forecast demand (the prospective number of specialists) at oil refineries and petrochemical enterprises is currently increasing and will continue increasing until 2024.

Graduates in the field of training Energy- and resource-saving processes in chemical technology, petrochemistry, and biotechnology are in demand at the enterprises of the chemical and petrochemical industry of the Region, including NK REFINERY, KNPZ, Syzran Refinery, Otradnensky Gas Processing Plant, Neftegorsky Gas Processing Plant, Samaraneftegaz, as well as at R&D institutes (Giprovostokneft, Samaraneftekhimproekt, SamaraNIPIneft, Samaragiprotruboprovod – a branch of Giprotruboprovod). Graduates are in demand also by the state administration and control bodies of the Samara Region (the Ministry of Forestry, Environmental Protection and Nature Management of the Samara Region, the Ministry of Energy and Housing of the Samara Region, the Ministry of Industry and Trade of the Samara Region), the regional operator of the Samara Region for waste management – EcoStroyResurs, the interregional territorial administration of Rosprirodnadzor of the Samara and Ulyanovsk regions, and the Privolzhskoe Territorial Administration for Hydrometeorological and Environmental Monitoring.

Analysis of information indicators submitted by the higher education institution

In 2020 the share of agreements for employer-sponsored education was 8.6% of the total number of enrolled students. The agreements were concluded with Samara Plant “Kommunar”, Transneft Privolga, with the Ministry of Industry and Trade of Samara region and the Ministry of Energy and Housing and Communal Services of Samara region.

Share of students employed in their filed of study: 94,4%

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 programme:*
  - are substantially compliant with the requirements for modern professionals in the industry – 100%;
  - mostly meet modern requirements for professionals in this industry with minor deficiencies – 0%;
  - 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 – 45,4%*
- *Percentage of graduates who are partially satisfied with learning outcomes – 54,6%*

Almost 50% of students are fully satisfied with their employment after graduation.

3. Direct assessment of competencies by reviewers
Criterion assessment: good

During the site visit, a direct assessment of 4th-year students' competencies was conducted. There were 10 4th-year students who participated in the direct assessment, which is 6.7% 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 competencies that characterize personal qualities of a person, which are an integral part of his/her professional competence:

GC-1 the ability of abstract thinking, analysis, and synthesis.

GC-3 readiness for self-development, self-actualization, and use of creative potential.

- Assessment of competencies aimed at the development, maintenance and improvement of communications:

GPC-3 The ability to professionally operate modern equipment and devices according to the training area and profile (GPC-3).

GPC -4 Readiness to use methods of mathematical modeling of materials and technological processes, to carry out theoretical and experimental verification of theoretical hypotheses).

• Assessment of professional competencies (core competencies), including competencies that reflect the requirements of the regional and/or federal labor market, depending on the main consumers of program graduates:

PC-13 willingness to study scientific and technical information, analyze domestic and foreign experience on the research subject.

PC -14 Ability to apply contemporary research methods of technological processes and natural environments, and to use computer tools in research work.

PC -15 The ability to plan experimental studies, receive, process, and analyze the obtained outcomes.

In carrying out the procedure of direct assessment of competencies, the experts used the following testing and evaluation materials, which reflect the formation of students' competencies.

1. *The essence of the integrated waste management principles.*
2. *Give an example of the process intensification parameters.*
3. *What purpose is the flotation process used for in wastewater treatment plants and how does it proceed?*
4. *What is the Allowable discharge rate project?*
5. *Which type of anaerobic digestion process in the methane tank is optimal: mesophilic or thermophilic?*
6. *What determines the emissions dispersion rate in the atmosphere?*
7. *What is waste-free production and can it be implemented?*
8. *How does a batch reactor work in biological treatment?*

Based on the results of a direct assessment of competencies, experts identified a sufficient level of competency formation in the majority of students.

Level / Share of students	Sufficient level (students coped with 80 % of the proposed tasks)	Acceptable level (percentage of the solved tasks is from 50 to 79 %)	Low level (percentage of the solved tasks is less than or equal to 49 %)
Assessment of competencies that characterize personal qualities of a person, which are an integral part of his/her professional competence			
40% (4 persons)	+		
60% (6 persons)		+	
Assessment of competencies aimed at the development, maintenance and improvement of communications:			
80% (8 persons)	+		
20% (persons)		+	
Assessment of professional competencies (core competencies), including competencies that reflect the requirements of the regional and/or federal labor			

market, depending on the main consumers of program graduates.			
100% (10 persons)	+		

When assessing the quality of education, experts reviewed 10 GQWs, which was 6,7 % 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% compliant
2.	Tasks and contents of GQWs are aimed at confirmation of formation of competencies of the graduate.	95% compliant, (add an international focus)
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% compliant
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% compliant
5.	GQW results find practical application in industry.	100% compliant
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% compliance, the established scientific and analytical center "Industrial Ecology" and the active participation of students at the company contributes to this

Reviewers' recommendations and conclusions

Conclusions

1. The subject of the GQWs corresponds to the direction of preparation to the modern level of development of science and technology in the subject area of the programme – 100%.

2. The considered graduation theses contain a set of results and scientific statements, have internal unity, which indicates the ability of the authors to independently conduct a scientific search, using theoretical knowledge and practical skills, to see professional problems, to be able to formulate research problems and proper solving methods. The graduation theses are aimed at solving the targets of the Decree of the President of the Russian Federation V. Putin of 08.02.2021 №. 76 on the reduction of greenhouse gas emissions and the development of innovative energy- and resource-saving technologies – 100%.

3. The extent to which materials collected or obtained through undergraduate practice and course projects are used in independent research parts of the GQWs – 100%.

4. The subject of the GQWs is determined by the requests of industrial organizations and the tasks of experimental activities, solved by the teachers of the educational organization – 100%.

5. The results of the GQWs find practical application in industries – 100%.

6. Usage the results of scientific research of the department, faculty and third-party research and production and / or scientific research organizations in the independent research parts of the GQWs – 100%.

Recommendations

1. To expand the problematic issues of graduate theses to international (near/cross-border) levels, to increase the use of materials related to international projects and organizations (FAO, UNESCO, UNIDO, UNEP, etc.).

2. To implement in the framework of the educational program the provision of certificates of implementation or inclusion in the implementation plans of proposals developed by graduates in their theses.

3. To increase publication activity in journals with a high quartile (Scopus Q3 and higher) to increase the demand for specialists in the international arena and possible establishment of international contacts with subsequent joint research activities.

4. When conducting research, it is necessary to increase the use of contemporary scientific literature, including literature and articles in English, published in full-text databases.

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
Criterion assessment: good

Strengths

The development strategy of the educational program in this field of training is formed on the basis of the following documents:

1. Development Program of the Federal State Budgetary Educational Institution of Higher Education "Samara State Technical University" (SamSTU) until 2020;
2. Development Program of SamSTU till 2025;
3. Strategy for socio-economic development of Samara region for the period up to 2030;
4. National Project "Education" (Federal Project "Young Professionals" (competitiveness increase of professional education));
5. National Project "Science" (Federal Project "Development of Scientific and Scientific-Production Cooperation", "Development of personnel potential in the sphere of research and development");
6. Forecast of staffing needs of Samara region economy for the medium term in the context of the main professional EP;
7. Programme of world-class scientific and educational center activity "Engineering of the Future".

The analysis of the programme is carried out based on the results of monitoring and discussion of the programme at extended meetings of the graduate chair, the T&L Council of the faculty with the involvement of employers.

The update of the programme is implemented by including new academic disciplines and practices and is focused on the development of the elective practice-oriented component, and corresponding educational activities depending on the educational request of students (strategic objectives of SamSTU in terms of modernization of educational activities).

Based on the analysis, the educational programme is annually reviewed and approved by the Academic Council of the University.

The programme’s objectives are aligned with the demands of the labor markets. This is confirmed by the direct involvement of employer representatives (Giprovostokneft and Srednevolzhsky Research Institute for Oil Refining) in the development and implementation of the educational program.

The percentage of employers who believe that the program objectives fully or mainly meet the requirements of the labor market is 100%.

The implementation of the educational program is carried out by the scientific and pedagogical staff of chairs, as well as lecturers who are managers and employees of organizations whose activities are related to the profile of the Bachelor's program being implemented (having at least three years of work experience in this professional field).

Employers and graduates can regularly assess the key competencies formation based on the results of EP mastering the in the course of a survey conducted by specialists of the Development Coordination Department, including the Quality Service, the Department of Licensing and Accreditation of Educational Programs, and the Department of Informatization and Telecommunications.

Reviewers' recommendations and conclusions

1. To introduce certain core disciplines in English on a mandatory basis. This will improve the skills of cooperation with foreign partners in further professional experience and increase the chances of employment in foreign companies;
2. Based on the results of the survey submitted by the educational institution, which results were confirmed during the site visit, most of the students believe that their opinion is taken into account in the development and update of the T&L materials.
3. There are no basic departments of leading employers (at the level of programme implementation) in the university. It is necessary to consider the possibility of forming such departments, so in addition to academic knowledge, graduates will receive skills that are in demand in the market, as well as the possibility of employment in a large company immediately after graduation. For more active interaction, educational organization and leading employers could create joint services – for example, banks of ideas, projects that appear in the academic and student communities, could be of interest to enterprises. Or such a service as the search for enterprises by students to implement their ideas.

2. Program structure and contents
Criterion assessment: excellent

Strengths

The competency model of the programme corresponds to the Order of the Ministry of Education and Science of the Russian Federation dated March 12, 2015, № 227 "On approval of the Federal State educational standard of higher education in the field of energy- and resource-saving processes in chemical technology, petrochemistry and biotechnology (bachelor's level)".

The training programme is included in the list of priority areas of modernization and technological development of the Russian economy. Since 2014, the program implemented in the SamSTU is included in the annual directory "The best educational programmes of innovative Russia".

The acquired knowledge allows graduates to work at energy enterprises, oil refining complex, in state administration and control bodies.

The competency model of the program meets the requirements of employers and the needs of the region for the oil and gas industry.

The programme is developed and implemented taking into account the requirements of the Federal State educational standard of higher education, documents, and recommendations of the Federal Educational and Methodical Association (FEMA) on the integrated group of training areas and specialties, which, in turn, are consistent with the professional qualifications councils.

Recommendations

To open basic departments/ university's units with similar functions in enterprises that are consumers of graduates, or on campus. Such units provide an opportunity to make the most of the infrastructure of an enterprise for better training of graduates.

Additional information

During the site visit, experts held meetings with students and alumni of the evaluated program. One of the issues discussed was the correspondence of the structure and content of the program 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 program.

3. Teaching and learning aids

Criterion assessment: excellent

Strengths

Students have the opportunity to influence the process of T&L materials development and update by submitting proposals directly to the Chair of Chemical Technology and Industrial Ecology from the Student council using official memos and applications addressed to the Head of the Chair.

100% of disciplines' syllabi are approved by employer representatives - Giprovostokneft and Srednevolzhsky Research Institute for Oil Refining.

The graduate departments-developers can involve representatives of interested organizations-employers in the formation of the content, examination, and review of educational programs and (or) their components. Textbooks are subject to external review.

80% of the testing and assessment materials are developed based on actual practical situations, which is a huge advantage over competitive programs in other universities.

The Chair of Chemical Technology and Industrial Ecology and the supporting chairs are provided with T&L manuals, case studies, monographs, methodological instructions (for practical classes and laboratory work), educational and visual aids, educational and terminological dictionaries, T&L manuals for conducting work placement internship, pre-graduation practical training, and research work necessary for implementing the educational program.

Recommendations

1. To put into practice the defense of term papers, as well as final qualifying works in a project form. The graduation thesis in the form of a business project is a joint work performed by several students, demonstrating the level of readiness of students for independent professional activity.
2. To supplement the working schedules of the disciplines with modules dedicated to the world experience on the relevant issues.
3. To consider the possibility of introducing an additional discipline "Closed-cycle economy", which is a socio-economic paradigm of the transition from nature

exploitation to careful nature management, resource-, and energy saving, which is the most important for the formation of competencies of students in this field.

4. To consider the possibility of involving employers in the development of testing and assessment materials for even greater preparation of students for further professional activities.

Additional information

During the site visit, the experts got acquainted with the T&L materials developed in the educational organization. Most of the teaching and learning materials used in the educational process are developed on the basis of real-life practical situations.

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.

According to the results of the survey presented by the HEI, the results of which were confirmed during the site visit, most of the students believe that their opinion is taken into account in the development and update of the TLMs.

4. Educational technologies and methods.

Criterion assessment: excellent

Strengths

In research and teaching activities at the university, the most advanced methods of the educational process are used, as well as elements of software and information and communication technologies that contribute to the achievement of the declared competencies.

Practice-oriented teaching, active teaching methods, project activities, partially-search activities, and research methods in teaching contribute to the full exploration of the substantive aspects of the disciplines.

Besides, the "Center for Engineering Entrepreneurship and Innovation" is operating at the SamSTU, which was created to support activities in the formation, implementation, and development of engineering entrepreneurship and innovation at SamSTU. The Center's activities are aimed at supporting the initiatives of employees and students in the field of project implementation, commercialization of intellectual property results, creation and development of small innovative enterprises, assistance in fund raising for project and innovation activities.

Practical training syllabi are formed individually and approved by employers - Giprovostokneft and Srednevolzhsky Research Institute for Oil Refining.

Professional competencies of students are mostly formed at the laboratory and practical classes, during individual counseling within the framework of course projects and graduation thesis. The high level of professional competencies formation among the graduates of the educational program is evidenced by the reviews of organizations on the program, employer surveys, reviews of the graduation thesis, and the results of work of the State Examination Board. This information was fully confirmed during the site visit.

Several types of training sessions are used in the educational process, including cases, projects, and training that allow the full mastering of professional competencies.

Recommendations

Reviewers recommend implementing in the educational process the use of the following:

1. Advanced educational technologies: methods of project-based learning; methods of practice-oriented work in information environments and software used in employer organizations; and methods of mixed learning.
2. Various interactive educational technologies, including public online courses, and provide full information to students about the course title, the platform on which the massive open online course is located, and the duration of training when implementing the educational program. This will allow integrating the experience of foreign colleagues into the educational process, expanding thereby the student competencies.

5. Teaching staff

Criterion assessment: excellent

Strengths

The educational process involves personnel whose qualifications allow implementing the educational process using approved technologies and methods of educational activity.

Teachers are the authors of T&L publications, which allows them to demonstrate their qualifications, knowledge, and competencies.

SamSTU offers the created system of training and retraining which allows supporting the set of competencies of teaching staff, among which the most significant are general professional competencies, competencies in educational activities, in the field of research activities (including R&D), and the field of methodological activities.

Professional development of the SamSTU teacher is carried out whenever required but at least once every three years under the programs of the elective cycle with a labor intensity of at least 72 hours, which allows teachers of SamSTU to address professional problems, work with various information resources and software and methodological complexes, contemporary information and communication technologies, computer and multimedia technologies, digital educational resources, as well as increases the methodological literacy of the lecturer, including mastering of contemporary information and communication technologies.

The academic activity motivation system of teaching staff based on the key development directions of the university is institutionalized at the SamSTU, namely, by encouraging teachers to combine teaching with research activities, publishing articles in peer-reviewed journals, defending candidate's and doctoral dissertations, and developing the best teaching practices.

The main factors of the scientific block are qualitative and quantitative indicators that reflect the publication activity, the effectiveness of the implementation of scientific projects, grants, scientific and technical programs, as well as the amount of funding attracted within the framework of these projects. The educational block is represented by

indicators reflecting the achievements in the training of scientific and pedagogical personnel, attraction of talented applicants, and development and implementation of innovative educational projects.

Self-development and self-improvement are the criteria for extending the employment contract with the lecturer. The representatives of the teaching staff constantly gain new knowledge and skills through attendance of advanced training courses, internships, summer schools, and other events. The acquired knowledge and skills are used in teaching, as well as in scientific work.

The Council of Young Scientists and Specialists has been functioning in SamSTU for many years, which is a collegial coordinating body aimed at formation, practical implementation, control of research activities, and a system of measures for financial assistance to students, postgraduates, and young scientists of the university who are actively engaged in research activities.

To create and develop favorable conditions for the training of highly qualified specialists, as well as scientific and scientific-pedagogical personnel through the enhancement of research activities of students, postgraduates, and young scientists, their involvement in fundamental and applied research in priority areas of research activities of the university, as well as to form a succession pool and develop leading scientific schools of the university, SamSTU has established a Youth Scientific Society at each faculty/institute.

Moreover, 31% of the teaching staff delivering specialized disciplines are experienced in the profile of the implemented discipline, and 6% of the teaching staff combine work in an educational institution with professional activity in their specialty.

Almost 80% of lecturers are satisfied with the personnel policy implemented at the program level, which reflects the comfortable working conditions in the educational institution.

Recommendations

1. Transmission of the experience of the academic staff to the world stage: speaking at international conferences, publishing joint articles with leading foreign scientists, digitalization of disciplines taught, and cooperation with leading Russian universities.
2. To find an opportunity to attract leading foreign and Russian scientists and specialists to deliver lectures aimed at sharing experience and knowledge. In the first stages, it is possible to implement master classes and round tables remotely.

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. It should be noted that the Head of the program pays special attention to the selection of teaching staff that provides high-quality training of students.

After having analyzed the data presented, the experts conclude that the staff is strongly motivated and that the proportion of the teaching staff under 30 years of age is average and recommend that the head of the program optimize the composition of teachers, supplementing it with staff under the age of 30 years.

6. Material, technical and financial resources of the program

Criterion assessment: excellent

Strengths

Modernization of the material and technical resources is a priority aspect of the activities of the SamSTU and is focused on ensuring that the technical and technological condition and the level of property infrastructure meet the requirements needed for effective educational and scientific activities of the University, as well as its development.

For the implementation of the educational program, classrooms are used for lectures, seminars, course design, group and individual counseling, current control, and interim certification, as well as rooms for independent work, and rooms for storage and preventive maintenance of educational equipment. The premises are fitted with specialized furniture, laboratory equipment, technical equipment, demonstration equipment, and visual aids.

The equipment of the SamSTU Center for Collective Use "Study of Physical and Chemical Properties of Substances and Materials" is available for research activities.

The material and technical resources of SamSTU allow the implementation of e-learning in the educational process. Currently, the support of the educational process is carried out using the LMS system, through the personal accounts of students and lecturers in the Electronic Educational Environment.

A distance learning system based on the Moodle platform has been created to implement SamSTU online courses.

Recommendations

In the course of communication with students, the need to update the software used in the learning process was identified to provide students with basic skills in working with programs used in specialized organizations (for example, AutoCAD, UPRZA, and Integral).

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.

During the site visit to the educational organization, the experts' team examined the facilities. The data obtained allows to conclude that the classrooms are fully equipped.

7. Information resources

Criterion assessment: excellent

Strengths

An electronic library is available. Access to the library's databases and resources is provided in the students' personal accounts. The electronic library includes:

- electronic library
- study materials:
- Electronic Library System of Gubkin Russian State University of Oil and Gas;
- IPRBOOKS Electronic Library System;
- - Samara University Repository;
- - Electronic Library System of Ufa State Petroleum Technical University;
- scientific and scientometric resources:
- - foreign resources (Scopus, Web of Science, Science Direct);
- - Russian resources (VINITI RAS, eLibrary.RU, Federal Institute of Industrial Property).

Within the framework of information systems, the services of EIEE and AIS University have been created that allows sharing information, creating online courses, conducting remote training, forming and monitoring the class schedules. The Anti-Plagiarism system is used when checking graduation theses, dissertations, and teaching aids for incorrect borrowings (the presence of plagiarism).

A specialized “Thesis” resource ensures electronic document management.

Moreover, access to all educational electronic resources that are in the subscription of SamSTU is available from any computer that has access to the Internet using an individual login and password that all employees of SamSTU have.

Each student has a multifunctional Personal Account. Currently, the Personal Account contains the following information about the student during his/her studies at the university:

- Personal data, academic certificates, and entrance test results. The information is loaded automatically at the stage of enrollment of the student.
- Academic performance, and scholarships.
- Effectiveness of participation in events, publications, results of intellectual activity, and relations with organizations.

Recommendations

1. During the site visit to the University, the experts interviewed the students. Students have access to the databases only from the university. It is necessary to provide access to the electronic information and educational environment for students not only from the university but also outside the university.

2. To consider the possibility of introducing additional courses to teach students how to use the university's electronic library and show the advantages of using foreign databases, which are largely available at SamSTU.

8. Research and development

Criterion assessment: good

Strengths

Continuing education and independent learning in the course of work are carried out as a result of the interdisciplinary project implementation (teams are created based on the results of an annual competition and on the request of the university's industrial partner).

In 2018, within the framework of the development of the strategic project "Territory of Life", SamSTU for the first time consolidated educational, research, design, and production activities in the field of environmental safety of the region in the most relevant areas which included the following:

– elimination of sources of pollutant emissions;

– restoration of technogenic-disturbed territories in order to reduce the anthropogenic load and return them to economic use;

– elaboration of the concept of waste management system development, particularly as secondary material resources;

– development and implementation of highly hazardous industrial waste recycling technologies for oil and gas industry enterprises.

The strategic project of the Chair "Territory of Life" unites four interdisciplinary project teams (IPT) of SamSTU, consisting of specialists of environmental, pharmaceutical, and food profiles of the SamSTU teaching staff and students (bachelors, masters, postgraduates), as well as representatives of government authorities, business structures, and engineering corps of partner enterprises (Novokuibyshevskaya Petrochemical Company, Samaraneftegaz).

Each team works in its own direction, namely, "Development of direct and remote spectral sensor systems", "Technological and marketing aspects of the promotion of the pharmaceutical substance S-pregabalin", "Development of software for the design of new-generation medicines", and "Development of technology to produce edible films and derived packaging materials".

In 2018, the project was joined by the industrial IPT, which develops methods for assessing the state and technologies for restoring the geological environment affected by the petrochemical cluster of the Region. In August 2018, this team, under the terms of open tender procedures, signed a contract for implementing a three-year monitoring study of the geo-environment quality for Novokuibyshev Oil Refinery, followed by the development of technology for the environment remediation.

The main outcome of the IPT’s activity is the creation of an innovative, competitive product with subsequent registration of intellectual property rights.

To date, an application for a patent for the invention of the "Method for purifying oil-contaminated soil using high-pressure technology" has been filed.

100% of the R&D outcomes over the past three years in the educational process and in the system of educational activities management ensure the improvement and development of the educational process and increase in the professional competency of the university academic staff.

A system of research units has been created in the university structure, namely, laboratories at faculties and chairs, research centers, involving not only teachers and postgraduates but also students, and project groups.

Scientific activities include participation in competitions for grants and programs; conclusion and implementation of business contracts with enterprises; preparation of scientific publications; scientific conferences organization; organization and conduction of

research involving students (exhibitions, competitions, students' publications); organization of student conferences, etc.

Involvement of students and postgraduates in research allows mastering various research methods; developing independence in problems solving; teamwork skills when addressing particular problems; participating in the preparation of joint reports on the research results, writing articles, etc.

The scientific and analytical center "Industrial Ecology" is a form of integration of scientific, educational and project activities of the Chair.

The methodological work of the teaching staff is aimed at development and improvement of the teaching methodology of the discipline. The results of the methodological activity of the teaching staff of the educational organization consist in the publication of textbooks, methodological guidelines, monographs recommended for mastering of disciplines by students, and included in the lists of references of disciplines' syllabi.

Recommendations

1. To increase the proportion of lecturers participating in domestic and international scientific conferences as invited (plenary) speakers.
2. To increase the proportion of research works in international projects.
3. To increase the proportion of joint publications with the world's leading scientists.

9. Employer partcipation in the program implementation

Criterion assessment: excellent

Strengths

Cooperation with social partners has allowed creating a modern basis for the formation of professional competencies in the training field of the educational program.

The participation of employers in quality monitoring is carried out in the following interaction forms:

1. membership in State Examination Board (SEB);
2. review of the educational program for compliance with modern requirements of the labor market;
3. provision of project challenges (topics, cases) to fill the project fund within the framework of the technological entrepreneurship track;
4. review of graduation theses of students;
5. involvement of representatives of industrial partners in teaching activities as external part-timers;
6. supervision of practical training of students.

Employers provide financing for works based on the contracts and grants, provide a platform for practical training of students

The competencies of the graduate, formed as a result of mastering of the educational program, are in demand by employers, which is confirmed by the results of the annual monitoring of the demand and employment of graduates. The need for young specialists

who have most successfully mastered the educational program motivates industrial partners to participate in the implementation of the program.

Assistance to the employment of graduates of the program is provided systematically based on the work plan of the Department for work with Industrial partners, as well as by the activities carried out by the Chair, and the organization of practical training according to the approved schedule of the educational process.

Recommendations

For the integration into the global community, consider the possibility of creating international practical training bases.

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. This data allows stating the high level of graduate training for the labor market needs; not only the professional but also the communicative qualities of graduates were mentioned.

10. Students' participation in the program content determination
Criterion assessment: excellent

Strengths

Feedback is provided through an annual survey, conducted to identify satisfaction with the quality of training (including the quality of the educational program, the quality of the conditions and organization of training, conditions for extracurricular activities), as well as to assess the quality of teaching ("Teacher through the eyes of students"), implemented within the framework of various educational projects (feedback on the project outcomes). An effective feedback tool is an interaction with students within the framework of mentoring (curatorship, and tutor support).

Students take part in monitoring (surveys) that allows introducing new disciplines, as well as adjusting curricula of disciplines based on survey outcomes.

There have been changes in the curricula. For example, the number of credit points in the general scientific module decreased (from 10 to 6), which allowed increasing the number of hours for studying special disciplines in the variable part.

The assessment of the training quality is conducted taking into account the results of the annual survey of students.

Students have the opportunity to independently suggest the topic of the graduation theses and choose a project-based educational track.

Recommendations

1. Chairs and faculty should consider developing a system for encouraging the participation of students in determining the content of the program and the organization of the educational process. To strengthen the role of students in determining the content of the program and the organization of the educational process, it is proposed to implement monitoring of student characteristics and trajectories using regular surveys. The obtained data will allow the university administration to evaluate the effectiveness of the

educational program, make decisions on the program improvement, and evaluate the effectiveness of various teaching methods.

2. According to a survey of students, 33% of students believe that their opinion is taken into account in the program development. This percentage can be increased by identifying specific aspects on which students believe that their opinion is not taken into account.

Additional information

During the site visit, the experts have analyzed the participation of students in the student self-government bodies. Based on the analysis of the obtained data, the expert conclude that there is a high level of interaction between students and the educational organization.

11. Student services at the program level
Criterion assessment: excellent

Strengths

Pertinent issues affecting the interests of students are discussed at meetings of the Students Union Organization and the Student Council, functioning at the SamSTU. Representatives of the Union and Student councils take part in the work of Academic councils of faculties and the Academic Council of SamSTU, as well as scholarship commissions, in the discussion of issues related to the distribution of vouchers to recreation centers and the sanatorium of SamSTU.

The program aimed at forming the student corporate culture to preserve and multiply the traditions of the University has been developed. The "Code of honor of the SamSTU student" was adopted at the initiative of the students.

The university has 18 creative studios, student TV, the SamSTU TV studio, and the Open KVN league in Samara, as well as the Spiritual and educational center, the Typhoon military-patriotic club, the Polytechnic search team, the student operational law enforcement team Vector, the volunteer center "Look around you" and the Cultural and youth center, and the KVN team Volzhane SamSTU, which reached the final of the highest league.

In 2020, the Center for urban initiatives Urban Club was established, which is a public organization of SamSTU that unites students, postgraduates, and young professionals to address issues of urban environment development.

The University has more than 40 sports sections in 24 sports.

Students have equal rights to an increased academic scholarship for achievements in educational, research, social, cultural, creative, and sports activities.

Students living in cities and localities of the Samara Region are entitled to social support for paying for commuting on suburban and intercity (intra-regional) road transport, carried out at the expense of the regional budget in the amount of 50% of the fare for eight trips per month during the academic year.

For students who do not receive a social scholarship, but find themselves in a hardship life situation, an opportunity is provided to receive free meal vouchers in the university canteens at the expense of funds received from income-generating activities.

More than 1 600 students receive free admission vouchers to the SamSTU recreation center.

The SamSTU provides an opportunity to undergo extra training (programs "Translator in the field of professional communication", "Industrial safety", and "Oil and gas production operator").

In addition, the student is allowed to work on a flexible schedule within the framework of an employment contract. Places of work:

- Research laboratories (within the framework of external grants and research contracts);
- Resource centers of the Science Park;
- Educational Program Directorates;
- As a member of the admissions committees;
- As a member of the other administrative divisions.

Recommendations

To strengthen the students' motivation to take foreign language courses at the university. To consider the possibility of creating interest groups that would be conducted in a foreign language. The coordinator could also be an English teacher. Teachers of specialized disciplines can also be involved in these groups.

Additional information

During the site visit, the experts were provided with documents confirming the students' attendance of supplementary courses and programs. Based on the analysis of the presented data, the experts conclude that students can choose and acquire a qualification within a further professional education if they wish.

12. Career guidance

Criterion assessment: excellent

Strengths

Systematic and active career guidance work is carried out, aimed at the enrollment of students from different regions of the Russian Federation.

Career guidance and training of potential applicants at SamSTU is supervised by the Vice-rector for human resources development and the Center for professional orientation, pre-university programs, and organization of student admission.

In 2020, three "Welcome Day" events were held, where applicants and their parents received information on admission to SamSTU; documents required for admission to the university; the number of budget and target places, as well as the number of places for a special category of citizens; detailed information was provided on each educational program implemented at the Faculty of Chemistry and Technology of SamSTU; methods of social support for students, etc.

Throughout the year, regular tours are held to the academic buildings of SamSTU, particularly, to the chairs of the Institute of Oil and Gas Technologies, where schoolchildren receive detailed information about educational programs, academic staff,

and equipment used both for scientific activities and for educational programs implementation.

Online work with schoolchildren is constantly carried out through video conferences, and communications through social networks.

SamSTU regularly holds Olympiads, conferences, technical and creative competitions. A subject school is organized.

Availability of a career-oriented educational project STARTPOINT SAMARA POLYTECH which goal is professional self-determination and the development of applicants.

For the participants of the project there are not only standard courses to prepare for admission to the university, but also thematic master classes and open lectures by professionals in various fields of activity.

The Center for the modern competencies development "House of Scientific Collaboration (DNA)" operates within the framework of the national project "Education/The success of every child" in SamSTU since 2019.

Every year, SamSTU hosts a scientific and technical conference of students "Days of Science", which includes also a special section for schoolchildren "Chemistry and Life".

The created scientific and educational program "Vzlet" is a program aimed at selecting on a competitive base and enrolling gifted schoolchildren of the Samara Region in the Governor's register of creatively gifted youth in the field of science, engineering, and technology. The program unites the high schooler, the teacher, and the scientific adviser of the university into a single team, which is targeted at research work in the chosen area. The program has been running since 2015 under the leadership of the Interuniversity Center for creatively gifted youth in the field of science, engineering, and technology.

Recommendations

To use more widely marketing communication means to attract foreign applicants (development of career guidance videos in several languages with an emphasis on the uniqueness of the program and its strengths).

Additional information

Based on the analysis of the documents and interviews with the program’s management, the experts identified the activities carried out during the last academic year: individual counseling provided by the Department for work with industrial partners. This allows applicants to choose the most accurate training orientation.

Curriculum Vitae of Experts

Name: Anna Kurbatova

Employer, position	RUDN, Faculty of Ecology, Associate Professor
Academic degree, title	Candidate of Biological Sciences, specialty Ecology, Associate Professor
Honors	International expert of the 10th International Conference-Forum of Chinese and International Experts in the field of High Technologies in Weihai. Full Member of the Russian Geological Society (RosGeo), expert-analyst in the field of ecology of the Moscow Refinery Gazprom.
Education	Master of Chemistry, Faculty of Physical, Mathematical and Natural Sciences, RUDN. Translator from English and Spanish into Russian in natural science disciplines.
Professional achievements	Authored more than 90 scientific articles, reviewed in the RSCI database, SCOPUS WEB of Science, including 3 monographs, 7 textbooks (2 in English, 1 textbook in Spanish), one textbook with the label of the Academic Methodological Association of the Higher Education. For 11 years, A. Kurbatova has been cooperating with the A.A. Dorodnitsyn Computing Center of the Federal Research Center "Informatics and Management" of the Russian Academy of Sciences, where she annually participates in the RFBR grant projects. Providing consulting services for Domodedovo Airport in the field of water supply and sanitation systems, wastewater transportation, quality control of drinking and tap water. Working as an expert in Ecostandart, taking part in the projects for monitoring the waste management of Tolyattiazot, and the Plant of Mineral Fertilizers in Berezniki. Guest lecturer at the advanced training course "Fundamentals and principles of closed-loop economy. The opportunities for implementation of German experience in the Russian Federation" in the framework of the Russian-German project "Climate-neutral waste management in the Russian Federation" of the German Society for International Cooperation (GIC) GmbH. Author of open online courses in English:

	MOOC "Climate Change: Adaptation and Mitigation Strategies", Iversity Springer, "Surface Water Quality: management and modeling", Open Learning, «Drinking Water: quality and treatment systems», «Advanced technologies in biological water treatment». In Spanish: "Monitoreo y evaluacion de la calidadambiental", Stepik https://stepik.org/course/89007/reviews
Research interests	Integrated water resources management, solid waste management, climate change adaptation and mitigation strategies, closed-loop economy
Practical experience in the field of the program under review	Since 2007 to present – Associate Professor at the Chair of Environmental Monitoring and Forecasting at the Faculty of Ecology, Head of the Bachelor's and Master's degree programs "Bioengineering of the Environment" in the field of training 18.03.02 and 18.04.02 Energy- and resource-saving processes in chemical technology, petrochemistry, and biotechnology, Head of the Joint Educational Program with Tomsk State University "Environmental quality assessment: Management and modeling", Head of the professional development program "Ensuring environmental safety when working with hazardous waste».

Name: Irina Yefimova

Employer, position	Silkway International University, Rector European Chemical Thematical Network expert
Academic degree, title	Candidate of Economic Sciences, Associate Professor
Honors	EPAN member
Education	1989-1994 Kazakh Chemical Technology Institute Specialty - Economics and Management in Industry 1998-2001 Post-graduate studies at M.Auezov South Kazakhstan Technical University Defence of thesis for the degree of Candidate of Science in the Institute of Economics of the Academy of Sciences of the Republic of Kazakhstan (Karaganda)
Professional achievements	She is the author of more than 70 scientific articles, peer-reviewed in the RSCI and SCOPUS, including two monographs, seven textbooks (two in English). She is a Professor of the Jean Monnet

	International Program (ERASMUS+).
Research interests	- development of internal quality assurance system in the university; -development and examination of educational programs based on competency-based approach; - implementation of advanced learning technologies
Practical experience in the field of the program under review	1994-1996 Kazakh Institute of Chemical Technology, Teacher 1997-2004 Auezov South Kazakhstan State University, Deputy Dean 2004-2005 Auezov South Kazakhstan State University, Dean 2006-2010 Auezov South Kazakhstan State University, Advisor to the Rector, Director of Teaching and Learning Department 2011-2018. Director of the Bologna Process and Academic Mobility Center 2018-2021 Rector of SILKWAY International University (Kazakhstan)

Name: Alena Basamykina

Employer, position	Areal Engineering, Head of the Technical Department
Academic degree, title	N/A
Honors	N/A
Education	Bachelor's degree in the field of 1Energy- and resource-saving processes in chemical technology, petrochemistry, and biotechnology, Faculty of Ecology of the RUDN. Master's degree in the field of Ecology and nature management, profile Recycling of production and consumer wastes, Faculty of Ecology of the RUDN.
Professional achievements	MOOC coauthor of "Advanced technologies in biological water treatment"; Participant in international conferences; Guest lecturer at masterclasses in the training field Energy- and resource-saving processes in

	chemical technology, petrochemistry, and biotechnology.
Research interests	Water resources management at the enterprise and in the field of housing and communal services, wastewater treatment technologies, waste management, economic strategies in the field of waste and wastewater management, energy- and resource-saving technologies.
Practical experience in the field of the program under review	Since 2019 to present – Project Manager at Areal Engineering (part of the Russian-German group of companies Infrastrukturgesellschaft 2055 mbH); 2016-2019 – employment by the German company "Huber Technology" as an intern, then as an Assistant Project Coordinator. Professional competencies: • Assessment of the sources of wastewater and the development of technological schemes of treatment and wastewater management scheme, taking into account the characteristics of a particular enterprise or locality; • Technological audit of wastewater treatment facilities; • Design of treatment facilities (Project manager); • Development of technological solutions for the solid and liquid wastes processing (including toxic waste); • Commissioning of technological lines for wastewater treatment and waste processing; • Study of innovative solutions for wastewater treatment, as well as their implementation at facilities in Russia; • Selection of equipment, development of technological schemes for water treatment, water conditioning and purification, and treatment of sewage sludge; • Sampling for laboratory tests, laboratory testing, selection of proper reagents; • Translation of technical documentation (manuals, operating instructions, technical data sheets of equipment) and other texts (including legal contracts and equipment warranties) from English and German.

Name: Oleg Korovin

Employer, position	Student, RUDN university
Academic degree, title	N/A
Honors	N/A

Education	4th year Bachelor's degree student in "Energy and Resource Saving Processes in Chemical Technology, Petrochemistry and Biotechnology".
Professional achievements	Participant of international conferences
Research interests	Development of energy-efficient technologies
Practical experience in the field of the program under review	Development of carbon-neutral energy cycles. Study of new methods of acetylene carbon black production using energy-efficient technologies