



**European Chemistry Thematic Network
Association**

Site Visit Report

For the application for the

CHEMISTRY EUROBACHELOR® LABEL

of the

Samara State Technical University

for the study programme

**Chemistry, Physics and Mechanics of
materials
(B.Sc.)**

Site visit:
12-13 April, 2021

The site visit was carried out partly online on the ZOOM platform. The review was organized jointly with the Russian accreditation agency AKKORK, the Russian members of the reviewers' team were directly at the university.

Composition and Affiliation of the Site Visit Team

Prof. Dr. Jiří Barek

Dr., Professor, 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) (ECTN expert).

Ella Dzidziguri

Doctor of Technical Sciences (Physicochemical Research of Metallurgical Processes), Associate Professor of the Department of Functional Nanosystems and High-Temperature Materials of the National Research Technological University MISiS (representative of the academic community).

Mikhail Fedotov

Ph.D. (Technical Sciences), Junior Researcher at the A.A. Baykov of the Russian Academy of Sciences (representative of the employers' community).

Elena Zakharova

Graduate of the Bachelor and Master programs Materials Science and Technology of Materials of the National Research Technological University MISiS (expert from the student community).

Background of the visit

History of the Institution

SamSTU is a large scientific and educational center of the Povolzhie region, which provides training for specialists for the Energy, Oil and Gas, Chemical and Petrochemical, Engineering, Transport, Food, Defense industries, Information technology, Instrument making, Automation and Control in technical systems, Materials science and Metallurgy, Biotechnology, Industrial ecology.

The university was founded in 1910. Samara provincial assembly unanimously decided to petition the government for the opening of the Polytechnic Institute in Samara. In the Samara district council, representatives of the Ufa, Orenburg provinces and the Tashkent region unanimously recognized that Samara is more suitable than other cities for the establishment of a polytechnical institute.

Mechanical, energy and chemical-technological institutes were open in Polytechnic Institute in Samara in 1930.

In 1935 Polytechnic Institute in Samara was transformed in Kuibyshev Industrial Institute named after V.V. Kuibyshev. In 1992 Kuibyshev Polytechnic Institute was transformed in Samara State Technical University (SamSTU).

In 2016 SamSTU has become one of the 11 core regional universities of the Russian Federation. The new status of the University and the expansion of its communication needs have set new challenges. It was a new corporate identity of the University, which reflects the vectors of development of the Flagship University and its values.

Today the list of the main professional educational programs of SamSTU includes programs of all levels of higher education, 24 enlarged groups of training fields. Training of highly qualified personnel in postgraduate studies is carried out in 21 directions. The university has 7 dissertation councils in 17 specialties.

In the period 2010–2012, 12 departments were organized, 86 profiles were opened in 43 areas of undergraduate studies and 12 new specialties. Along with 5 currently being implemented, 15 more master's programs have been licensed.

Today SamSTU is a basic platform for constructive interaction between the scientific school and business. The close connection of the academic community with production, the solution of specific practical problems that the practitioners pose for the scientists and teachers of the university, allowed to create a special environment. It integrates science, technology and engineering education. This enables the university to receive from employers a clear understanding of the requirements for the key competencies of the graduate and promptly adjust educational programs, and the synthesis of technical, humanitarian and economic fields of knowledge in one university allows scientists to successfully apply fundamental knowledge to solve practical applied problems at industrial enterprises in the region.

Statistical data

There are 63 students studying under the program Chemistry, physics and mechanics of materials, profile "Functional, structural materials and nanomaterials" in the academic year 2020-2021.

	F	M	Total
Chemistry, physics and mechanics of materials			
Bachelor	39	24	63

Assessment criteria

1. Learning outcomes: Chemistry-based Practical Skills

As a result of completing the Bachelor's degree program, the student must develop a set of universal, general professional and professional competencies. The set of mastered competencies must ensure the graduate's ability to carry out professional activities in at least one area or sphere of professional activity and solve professional tasks of at least one type. The curriculum declares 8 fields of professional activity in which the bachelor's programme graduates can carry out their professional activity. Types of the professional activity: research and engineering.

The program includes 50 disciplines and 5 practical training courses. The total number of ECTS credits in the program is 240. Of these, 220 credits (170 credits - compulsory) are obtained from the disciplines of chemistry, physics, biology and mathematics. The number of credits: in chemistry - 162 (115 obligatory), in physics - 36 (36 obligatory), in biology - 3 (3 obligatory), in mathematics - 19 (16 obligatory).

Practical training in the disciplines of the program takes 78 credits, of which 33 credits are allocated to laboratory work. In the educational program the following types of practices are implemented: educational (introductory and design) - 6 credits, industrial research - 3 credits, industrial - 7 credits and pre-diploma (preparation of the GQW, including the experimental part) - 3 credits. The practical training syllabi provide for the formation of competencies, with account of the specific industry and organizations in the region.

All programme disciplines are designed to develop the competencies of a graduate. Learning outcomes (to know, to be able to, to master) are formulated in each syllabus. Formation of competence skills, abilities and knowledge correlates with the employment functions in the professional standards, thereby complying with the labour market demands. The program forms competencies aimed at the development, maintenance and improvement of communication, personal competencies of the graduate, which are an integral part of professional competence, competencies that reflect the formation of entrepreneurial skills and abilities.

The educational technologies used in the educational programme implementation are focused on the declared competencies acquirement. To this end, different modern methods are used: discussions, role-playing games, analysis of real-life situations in professional activity, group decision-making activities, business simulation games in the "Conference" format – reports within the discipline, reports on the results of a scientific work. A large proportion of classes are conducted in the form of laboratory research practical trainings in classrooms equipped with special instrumentation. Master classes, case problems solving, and projects are envisaged.

The computer technologies enabling the use of the well-known databases in the educational process are applied. Individual consultations are carried out during Course Projects and FQWs (Final Qualification Work) implementation. The proportion of contact work with students during the educational programme implementation is 61.5%.

The questions and criteria for FQWs assessment make it possible to evaluate formedness of the declared competencies, designed in accordance with the requirements of the professional standards and taking into account the specific requests of enterprises and organisations.

The main consumers of the graduates in the labor market are enterprises of chemical and petrochemical industries, research laboratories, educational institutions. Graduates of this training field are versatile and are in demand almost at any production enterprise, where there is a laboratory. The graduates find employment in JV "MeKaMineft, TD AKOM, Zhigulevsk, Samaraneftegas, Novokuibyshevskaya Petrochemical Company, Novokuibyshevsk, Aviacor-Aviation Plant, Samara, Novokuibyshevsky NPZ, Novokuibyshevsk, Kuznetsov, Samara. About

90% of the 2018 - 2020 graduates work in their field of study. 100% of the program graduates are fully satisfied with their career development.

2. Structure

The programme uses the graduate competency model, which is a tool for the formation of knowledge, skills and abilities in accordance with professional standards. The curriculum of the program contains a basic part and an elective part of compulsory disciplines.

Structure	Program workload
Disciplines (modules)	206
Practical training	25
State Final Certification	9
Program load	240

- The graduate is awarded with a qualification "Bachelor".
- The period of study of the program on a full-time basis - 4 years.
- During the implementation of the Bachelor's program, the organization has the right to use electronic learning, distance learning technologies.
- Educational activities within the EP are carried out in Russian.
- The structure of the educational programme under review corresponds to the criteria of Chemistry EuroBachelor and can guarantee the achievement of the declared learning outcomes.

3. ECTS and student workload

The workload of the bachelor's degree programme per one academic year is no more than 70 CP regardless of the applied educational technologies or implementation of the bachelor's programme under an individual curriculum; and under accelerated education it is no more than 80 CP. This amounts to about 27 classroom hours and 27 hours of independent work per week. The State Final Examination includes the preparation and defense of a Final Qualification Work. The number of ECTS credits and student workload meet the Chemistry EuroBachelor criteria.

Students take part in a survey, and according to its outcomes new disciplines are introduced and the curricula, study load, and syllabi of the disciplines are adjusted. Local regulations prescribing organisation of the educational activities at SamSTU are reviewed by the Student council and accorded with the Student Union Committee before being approved by the Academic Council. The representatives of the student councils are included in the academic councils of the divisions.

4. Modules/Course Units and Mobility

Mobility is possible in all the bachelor's courses, but it is not recommended for the first two years. However, students who have been provided with the individual educational track are able to participate in the mobility programme starting from their first year. The modular structure of the programme and elective courses help to achieve the best results in the acquisition of professional knowledge and skills. At the moment, there is no information on the students studying abroad.

5. Methods of Teaching and Learning

During the four-year training classes are implemented in the following forms: lectures, laboratory work, practical training on problem solving, seminars, colloquiums, coursework, research papers, individual consultations, trainings. Modern methods are used: business and role-playing games, organizational-activity games, group problem solving, discussions;

"Brainstorming" technology; analysis of real situations of professional activity; case method, project method, master classes.

All educational courses are implemented using e-learning platforms and tools. The possibility of mastering the educational programme directly at the place of a student's residence is provided, combined in-person and online learning is implemented using distance learning technologies.

Research Work and the FQW are carried out under the guidance of a scientific advisor from among the teachers of the Chair. Research Work includes a practical part, which consists in a creative solving of a profession-related task. The obligatory part of a Research Work is the presentation of its results at scientific conferences and in specialised journals, therefore, the preparation of abstracts and articles and viva-voce reports is an integral part of a Research Work.

The university possesses research laboratories and centres available to students and project teams. Scientific activity in the university consists of:

- participation in the competitions for grants and programmes;
- implementation of commercial contracts;
- development of scientific publications;
- organization of scientific events for students.

At the Chair of General and Inorganic Chemistry, research is carried out in the following areas: modeling of phase-shifting functional materials; synthesis and study of the physical and chemical properties of optical luminophores; analysis of the effectiveness of salt formation inhibitors in accordance with their chemical composition; construction of 3D models of multicomponent dependences of substances magnetic properties on their structure; search for conductance channels in the ionic compounds structure; study of the structure of metal-organic frameworks. All teachers are engaged in research activities. The results are published in scientific journals, presented at conferences and approved by patents and conformity certificates.

All results of R&D, including FQWs, are used in the educational activities in the preparation of lectures, laboratory and practical classes in the professional disciplines and in the implementation of practical trainings and FQWs.

Students take part in the scientific activities already in their first year by compulsory participation in practice-oriented projects. Furthermore, students are engaged in scientific clubs, take part in conferences, exhibitions, competitions and prepare publications of the scientific results during the entire study period.

The teaching and learning methods used in the program meet the European ESG standards. The research activities of the teaching staff and students also meet both the ESG and the Chemistry EuroBachelor criteria.

6. Assessment procedures and performance criteria

During the semester performance control is carried out with oral quizzes, written assignments. The interim control - in the form of exams or tests. In the syllabi there are lists of questions for exams or tests, questions allow to assess the formed competencies and meet the requirements of Chemistry EuroBachelor.

7. Grading

Credit allocation tables according to the ECTS credit system are used for exchange students and students studying outside of exchange programs. They meet the requirements of Chemistry EuroBachelor.

8. The Diploma Supplement

The Diploma Supplement is drawn up at the individual request of any university graduate on the letterhead of the Spanish company "Signe, S.A." In Russian and English, the application

describes the level, status, content and results of the education received. In English, the document contains additional information about the holder of the diploma and his/her qualifications, as well as the content and learning outcomes in credits of the European Credit transfer and Accumulation System (ECTS).

The European diploma supplement contains all the necessary information and meets the requirements of Chemistry EuroBachelor. The expert team recommends that it should be given automatically to every graduate of the program free of charge and without individual request.

9. Quality assurance

The programme development strategy is accorded with the prospects for the development of the regional labour market and industry-based tendencies within the framework of the field of study, taking into account the analysis and forecasting of the regional labour market demands for specialists in this field and considering the admission of specialists from other educational programmes. The programme aims are consistent with the aims and objectives of a graduate's professional activities and with the content of the professional standards and labour functions as well as with the regional labour market demands.

The management of the educational programme is effective and envisages the involvement of lead specialists (including employers' representatives) in the development of its content and structure; organization and supervising of activities for the development of the curriculum and academic schedule; supervising of the academic staff work on the development of abstracts and disciplines syllabi and practical trainings as well as on the State Final Examination programmes development; development of the assessment tools funds and other materials that ensure the quality of a graduate's training; monitoring of graduates' demand in the labour market.

The programme teaching staff is represented by teachers and chairs academic staff, whose occupation is linked to the programme profile and who have at least 3 years of experience in this professional field. The list of teachers is made up by the heads of chairs based on the instructions issued by the Educational Department of SamSTU.

The overall programme management system is implemented by the following fundamental units:

1. Educational Department, which functions include the following:
 - full maintenance of learning and teaching documents and technical support for the distribution of the academic load;
 - organisation of the educational process in the structural units of SamSTU in accordance with the disciplines syllabi and curriculum.
2. Department for Cooperation with Industrial Partners, which is responsible for the following:
 - consideration of the regional economy demands for the personnel qualification in order to include them into the programme expected outcomes;
 - interaction with enterprises on the organisation of practical training for students;
 - participation in the implementation of regional and federal programmes and projects related to the cooperation of SamSTU and external stakeholders;
 - monitoring and career support of graduates.
3. Dean's Office of the Chemical and Technological Faculty, which supervises students' compliance with the education rules of SamSTU, changes of students' status, and the compliance of a class schedule with the disciplines syllabi and curricula.
4. Chair of General and Inorganic Chemistry, which develops learning and teaching documentation with the disciplines syllabi and curricula and distributes the academic load.

The current programme analysis is carried out in accordance with: the monitoring of employers' demands and the results of graduates' employment; experts' reports and reviews

from employers, taking into account decisions of the State Examination Board meetings; results of the annual programme monitoring and surveys of students and academic staff. The programme update is implemented through the inclusion of new academic disciplines and practical trainings. The development of the programme is focused on enhancement of the variable practice-oriented component and appropriate educational activities for the educational needs of students.

The program's education quality assurance system meets the requirements of Chemistry EuroBachelor.

10. Employability

The first enrollment in the program was made in 2011. The number of graduates who defended the GQW in 2018 - 20; in 2019 - 26, in 2020 - 18 people.

Alumni of 2018 academic year of graduation:

- Working in the field of training in the region: 95.0%
- Working in the field of training outside the region: 0%.
- Not employed in their field of training: 5.0% (reason - start of their own business).
- 2 graduates of the year 2018 enrolled in postgraduate studies at the General and Inorganic Chemistry Chair and were employed as educational support staff.

Alumni of 2019 academic year of graduation:

- Working in the field of training in the region: 77%
- Working in the field of training outside the region: 11,5%
- Not employed in their field of training: 11,5% (reason - start of their own business)

Alumni of 2020 academic year of graduation:

- Working in the field of training in the region: 72,4%
- Working in the field of training outside the region: 11%
- Not employed in their field of training: 16,6% (reason - start of their own business)

The quality of the educational programme is confirmed by the high percentage of graduates' employment.

11. Ethical concern

All GQWs are checked for anti-plagiarism, the uniqueness of the entire thesis must be at least 50%. The results of the report prepared by the anti-plagiarism system are a prerequisite for admission of the thesis to the defense. This practice complies with ESG.

12. Any other comments / information

ARES Academic Ranking of World Universities-European Standard - 55th place out of 173 Russian universities; Webometrics Ranking of World Universities - 70th place out of 1223 Russian universities; 4 International Colleges & Universities Ranking - 85th place out of 386 Russian universities.

Ranking of demand for graduates - 3rd place out of 132 Russian universities; Expert RA Annual Rating of Russian universities - 52nd place out of 100 Russian universities; Interfax National University Ranking - 65th place out of 238 Russian universities.

The Chemical and Technological Faculty was founded in 1930; currently, 538 people are studying full-time; since 2013, 470 graduates have been trained; the teaching staff includes 15 Doctors of Sciences, 62 Candidates of Sciences.

The Chair of General and Inorganic Chemistry of the Chemical and Technological Faculty was created in 1930; there are 3 Doctors of Sciences, 20 Candidates of Sciences; in 2020 Doctor of Chemistry, Professor V. Blatov became the Head of the Chair, he is also Director of the International Research Center for Theoretical Materials Science.

Over 1000 works have been published by the staff of the Chair, with more than 100 copyright certificates and patents, over 500 articles, abstracts of reports at scientific conferences, meetings, symposiums of various levels, as well as 15 monographs; since 1993 37 candidate and 5 doctoral theses have been defended by postgraduate students and doctoral students of the Chair.

For 20 years, Doctor of Chemical Sciences, Professor I.K. Garkushin has been the chairman of the section "Inorganic chemistry" of the Samara regional Student scientific conference, since 2010 the Chair has held annually the experimental regional round of the All-Russian Olympiad of students.

Persons seen

Discussion with representatives of the institution's leadership

1. *Yusupova O.V.* – Vice- Rector for Academic Affairs;
2. *A.S. Zotova* – Vice - Rector for International Cooperation;
3. *Kostyleva I.B.* – Counselor at the Rector's office of SamSTU;
4. *Alontseva E.A.* – Head of Educational Department;
5. *Smirnova S.B.* – Head of the Department for Work with Industrial Partners;
6. *Malinovskaya Y.A.* – Head of Development Coordination Department;
7. *Prokofieva E.Yu.* – Head of the Department for Work with Foreign Students;
8. *Safronov V.V.* – Dean of the Faculty of Chemistry and Technology (CTF);
9. *Nechaeva O.A.* – Director of the Institute of Oil and Gas Technologies (INGT);
10. *Novokshchenov S.G.* – Director of the Scientific and Technical Library;
11. *Saushkin I.N.* – Head of Informatization and Telecommunications Department;
12. *Vaskov E.N.* – Head of the Department for Educational and Social Work;
13. *Gereykhanova E.E.* – Chairman of the Student Council;
14. *Frank K.V.* – Chairman of the Student Union Committee;
15. *Blatov V.A.* – Head of General and Inorganic Chemistry Chair;
16. *Klimochkin Y.N.* – Head of Organic Chemistry Chair;
17. *E. L. Krasnykh* – Head of Technology of organic and petrochemical synthesis Chair;
18. *Tupitsyna O.V.* – Head of Chemical Technology and Industrial Ecology Chair;
19. *Tyshchenko V.A.* – Head of Chemical technology of oil and gas processing Chair;
20. *Mashchenko Z.E.* – Head of the Monitoring Division of the Licensing and Accreditation of Educational Programs Department.

Discussion with those responsible for the programme

Ekaterina Egorova – Associate Professor, Chair of General and Inorganic Chemistry.

Discussion with members of the Teaching staff

1. *Blatov V.A.* – head. chair
2. *Garkushin I.K.* – professor
3. *Kondratyuk I.M.* – professor
4. *Olga Blatova* – Associate Professor
5. *Frolov E.I.* – Associate Professor
6. *Burchakov A.V.* – associate professor
7. *Danilushkina E.G.* – Associate Professor
8. *Egorova E.M.* – Associate Professor
9. *Lisov N.I.* – associate professor
10. *Sukhareenko M.A.* – Associate Professor
11. *Raschepkina N.A.* (videoconference)
12. *Guryanov N.Y.* (videoconference)
13. *Khokhlova A.A.* (videoconference)
14. *Yashin V.N.* (videoconference)

Meeting with the students

First year students:

1. *Antonyuk A.V.*
2. *Berezova E.A.*

3. *Galstyan M.A.*
4. *Galuzha V.V.*
5. *Kazachkov K.A.*
6. *Kalinichev, A.S.*
7. *Martyshkina N.O.*
8. *Morozov I.A.*
9. *Osipov V.T.*
10. *Pleshakov K.D.*
11. *Karpenter U.S.*
12. *Slavnov T.D.*
13. *Solodovnikova M.A.*
14. *Syulyukina D.S.*
15. *Yudova O.A.*

Subjects discussed during the site visit

1. Representatives of institution's leadership

O. Yusupova – Vice-rector for Academic Affairs – presented Samara State Technical University, its goals, objectives, and achievements. She described the development strategy of the university, the role of accreditation of chemistry programs in further improvement of the education quality.

A. Zotova – Vice - Rector for International cooperation – spoke about plans in the field of internationalization, on the attraction of foreign students, development of programs of double diploma.

E. Alontseva – the Head of the Educational Department – described the organization of the educational process, the training technologies used, the introduction of new fields of study, the development of new training programs and their updates, the quality of teaching staff qualification, computerization of the educational process, access to information resources for students and employees of the university.

S. Smirnova – Head of the Department for Work with Industrial partners – listed the main industrial partners, their participation in the educational process, areas of cooperation, places of employment of graduates, the employment rate of graduates in recent years, the employers' satisfaction with the quality of graduates' education.

Prokofieva E. – Head of the Department for Work with Foreign Students – noted that her Office helps to organise international student exchange. The activities focus on students and teachers as well. In addition, the faculty supports student mobility by a local coordinator. The current focus is on incoming students.

E. Gereykhanova – the Head of the Student Council – told about the participation of the student community in the activities of the University.

The meeting was interesting and confirmed the high level of organization of the educational process and the interest and good personal qualities of those responsible for it.

2. Persons responsible for the programme

V.A. Blatov – Head of the Chair of General and Inorganic Chemistry.

E.M. Egorova – Head of the educational program Chemistry, physics and mechanics of materials.

Employers take part in the educational process, in the meetings of chairs, in the formation of the educational programme and the competencies required, assert direct tasks from enterprises in the form of FQWs topics or technological tasks. The university holds a survey of students, teachers and employers at least 2 times a year.

The programme supervisors are the members of the councils under the region's administration.

The performance of the teaching staff is appraised using a rating system, which includes criteria for educational and research work and a methodical part. In the absence of a number of criteria, points are deducted.

The university categorises its chairs, and the mandatory criterion of such categorisation is the publication of scientific articles in the WoS and Scopus systems, as well as reports at scientific conferences.

The monitoring of the educational programmes is also carried out. Currently, the information collection and accumulation is being carried out and at the same time the criteria for the educational programmes assessment are being developed. For the 1st category chairs, a reduction of a teaching load on the teaching staff and an increase in the proportion of research activities are provided. The educational programmes are updated annually.

The Student Council takes an active part in the development of the university regulatory documents. The representatives of the Student Council are members of the faculty and institute academic councils.

Students are engaged in the research activities starting with the second year of study, which are carried out both within the walls of the university and during the production trainings.

Currently, 1 student of the programme receives employer-sponsored education.

Graduates generally choose job in their degree field.

The meeting with the program management confirmed the impression of a high level of implementation of the EP. Expansion of cooperation with other chairs would be advisable for the development of the EP.

3. Teaching staff

At the meeting with the teaching staff, the balance of the scientific and teaching activities of the staff was noted. Teachers, including young specialists, are motivated by financial and other means. Incentive payments are rewarded for the publication of scientific articles, depending on the IF of a journal.

The teaching staff compulsorily undergoes advanced training courses at least once every 3 years with a duration of not less than 72 hours. The university has created a special structure that provides career development courses.

The topics of FQWs are determined by teachers – scientific advisors of research works, by students themselves and by employers. Also, the topics for FQWs are determined as a result of grants implementation

In order to conduct internships for students and staff, the Chair interacts with laboratories of Germany, Italy and Russia. Currently, the disciplines which will develop students' communication skills are being developed in English.

The meeting confirmed the impression of a highly professional teaching staff.

4. Students

Students noted the optimal balance of practice and theory in the curriculum.

Meetings are held with the representatives of various enterprises, at which they talk about the types of work activities carried out in these organisations, the prospects for employment and further professional life, offer specific job positions, accept for the production training averaging 27 days.

The opinion of students is taken into account on various aspects: on the volume of courses, subscriptions to databases and internal structure. A survey is also conducted.

In order to discuss urgent problems, the meetings are arranged with the Dean's Office and heads of chairs.