



профессионально-общественной аккредитации

SUMMARY REPORT

on professional public accreditation of the cluster of educational programmes

 – «Computer Science and Computer Engineering» (09.03.01)

— «Information systems and technologies» (09.03.02, 09.04.02)

Delivered by D.I. Mendeleev Russian Chemical-Technological University

2021

While preparing this Summary Report we used information from the Self-Evaluation Report and the Report on the External Review of the cluster of educational programmes «Computer Science and Computer Engineering» (09.03.01), «Information systems and technologies» (09.03.02, 09.04.02) delivered by D.I. Mendeleev Russian Chemical-Technological University. The presentation document for the use by the National Accreditation Board.

 $\ensuremath{\textcircled{}}$ National Centre for Public Accreditation, 2021

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GENERAL INFORMATION ON THE EDUCATIONAL INSTITUTION

Full name of the educational institution	Federal State Budgetary Educational Institution of Higher Education « D.I. Mendeleev Russian Chemical-Technological University»		
Founder	<i>Ministry of Science and Higher Education of the Russian Federation</i>		
Year of foundation	1898 — Moscow Industrial College 1918 — Moscow Chemical Technical School 1922 —Moscow Chemical-Technological Institute 1992 — D.I. Mendeleev Russian Chemical- Technological University		
Address	9, Miusskaya Squ. I	Moscow, 125047,	
Rector	Alexander Mazhuga, Doctor of Chemistry, Professor		
License	Series 90Л01 №8964 reg. № 1930 of 08.02.2016 permanent		
State accreditation		Accreditation Series 90A01 № rom 19.06.2019 until 19.06.2025	
State accreditation		6438 53	

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Off site

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INFORMATION ON THE STUDY PROGRAMMES UNDERGOING ACCREDITATION

Educational programmes	«Computer Science and Computer Engineering» (09.03.01), «Information systems and technologies» (09.03.02), «Information systems and technologies» (09.04.02)
Level of training / Standard period of training	Bachelor degree programme / 4 years Master degree programme / 2 years
Structural subdivision (Head)	Faculty of Digital Technologies and Chemical Engineering (Sergey Dudarov, Cand. Of Technical Sci., Associate Professor)
Major Departments (Heads)	Department of Information Computer Technologies (Eleonora Koltsova, Doctor of Technical Sciences, Professor)
Срок проведения экспертизы	April, 20-22, 2021
Ответственные за аккредитацию	Dmitry Lopatkin, Candidate of Economics, Head of the Department for Quality, Licensing and Accreditation, Andrey Zhensa, Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Information Computer Technologies

SAMPLING RESULTS OF THE NATIONAL AGGREGATED RANKING BY SUBJECT

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OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERATION OPERA							
National Aggregated Ranking of HEIs							
Total number of Integrated Groups of Training Areas (IGTA) delivered in the HEI							
Distribution of IGTA according to the Leagues							
League	Number of IGTA	8% 31% л	Іремьер- ига				
Premier League	4	2	лига лига				
League 1	6		лига				
League 2	2		лиа				
League 3	0	6 46%	лига				
League 4	1	40%					
Russian Federation							
Number of HEIs implementing similar IGTA in the RF							
Распределение	вузов по лига	м в рамках УГСН					
League	Number of HEIs	49 15%	Премьер-				
Premier League	25	60	лига 1 лига				
League 1	60	18%	2 лига				
League 2	80		3 лига				
League 3	110	80	4 лига				
League 4	49	110 34%					

NUMBER OF APPLICANTS ENTERING THE EDUCATIONAL PROGRAMMES



ACHIEVEMENTS OF THE EDUCATIONAL PROGRAMME

Quality of implementing the educational programmes

The quality of the implementation of the educational programmes is ensured by timely revision of the content of the programmes in order to comply with the requirements of the Federal State Educational Standard and in order to take into account the latest scientific achievements and to update information and methodological support.

Provision of up-to-date education

The relevance of the content of education is ensured at all stages of the development and implementation of the main professional educational programbys.

Teaching staff

The teaching staff covers all areas and disciplines provided for by the main educational programbys. The structure of the teaching staff makes it easy to adapt to new professional requirements. The teachers of the Department of Information Computer Technologies have the opportunity to constantly improve their qualifications, to contact colleagues from leading universities in Russia and abroad.

Independent assessment of student learning outcomes

The use of procedures for independent evaluation of learning outcomes is confirmed by prizes and high places awarded to students by external experts at Russian, regional and international conferences, forums, hackathons, contests and Olympiads: "AI for Good by Microsoft", "STEP INTO SCIENCE", "Student of the Year", Supply Chain Cup, "International Congress of Young Scientists in Chemistry and Chemical Technology", "Current Issues of Modern Science: Theory and Practice", etc. and employer reviews of graduates of the Department of Information Computer Technology.

Every year students of the educational programmes under review become laureates of competitions. In the 2019-2020 academic year, undergraduates of the 09.04.02 educational program Vasiliev M.V. and Podobedova A.S. received a Diploma of the III degree for winning the I (correspondence) round of the IV All-Russian competition of research works of students and postgraduates of universities and scientific academic institutes of Russia in sciences and humanities "STEP INTO SCIENCE". In the 2019-2020 academic year, students of the educational program 09.03.01 Pastukhov D.S., Baranov E.D., Bogodukhova A.S., Bocharov M.A., Zemtsov M.M., Ilyin D.V. became winners of Microsoft's AI for Good Hackathon. In the 2020-2021 academic year, a student of the educational program 09.03.02 Slobodchikova Yu.I. became a prizewinner (3rd place) of the All-Russian case championship for solving problems in the field of supply chain management - Supply Chain Cup 2020. In the 2020-2021 academic year, students of the educational program 09.03.02 Kuznetsov D.V., Slobodchikova Yu.V., Safin M.R., Gakiev A.N., Aleshin M.A. became prize-winners (2nd place) of the Hackathon AI for Good by Microsoft.

Learning Resources

The Department of Information Computer Technologies has classrooms for conducting lecture-type classes, seminar-type classes, laboratory work, current control and intermediate certification, course work and preparation of course papers, which are widely used in the implementation of educational programs. The Department of Information Computer Technologies has 4 computer classes (rooms 117, 119, 123 and 125 of the Tushinsky educational complex of the D.I. Mendeleev Russian Chemical Technological University) for conducting laboratory classes in the disciplines of educational programs.

Research

Annual conferences are aimed at the development of students' research culture: "International Congress on Chemistry and Chemical Technology" (section No. 11 "Information Technologies, Cybernetics and Mathematics" was organized and held on November 06, 2019), "Conference of students of the Faculty of Digital Technologies and Chemical Engineering" (was organized and held on June 03-05, 2020), hackathons and scientific events at various levels, in which students, undergraduates and postgraduates of the Department of Information Computer Technology participate.

Thanks to research projects and scientific connections of the Department of Information Computer Technologies, students have the opportunity to carry out research work at the world level and are coauthors of publications in peer-reviewed journals. The Department of Information Computer Technologies is a participant in contracts with the Ministry of Education and Science under the Federal Target Program (Agreements No. 14.574.21.0158, No. 14.583.21.0064) of RFBR grants (grant No. 20-07-00886).

Academic mobility of students

D.I. Mendeleev University carries out international cooperation in the field of education and science with foreign scientific and educational institutions and organizations, on the basis of concluded international agreements. Currently, the University has more than 120 contracts with universities and organizations from 35 foreign countries: France, Germany, Great Britain, Ireland, Switzerland, Finland, Italy, Japan, USA, Czech Republic, Poland, Hungary, Serbia, Chile, Egypt, Tunisia, Syria, Libya, China, South Korea, Vietnam, Norway, Guinea, Bulgaria, Singapore, Greece, Iran, Netherlands, Mexico, Spain, Austria, Ecuador, Mongolia, Myanmar and 7 CIS countries: Ukraine, Kazakhstan, Kyrgyzstan, Belarus, Uzbekistan, Tajikistan, Azerbaijan.

The academic performance of students is closely related to the results of research. Within the framework of the agreements, the mobility of students, teachers and researchers is being developed, scientific conferences and seminars are being held, the educational process at individual faculties is being optimized, joint research and development is being conducted. Students of educational programs present at conferences of various levels. Participation in exhibitions contributes to the development of students' research culture.

Employability of graduates

The need of companies, manufacturing enterprises in Moscow and the regions, information, banking, commercial companies (in the directions 09.03.02, 09.04.02) – 20-30 specialists per year; companies related to the development of graphic objects, design (in the direction 09.03.01) – 15-20 specialists. The need is at least 5 specialists per year for scientific, research and educational institutions (academic institutes).

International projects

International contacts of the Department of Information Computer Technologies are constantly developing. Joint research is carried out and scientific seminars are held with colleagues from foreign organizations and universities.

The Department of Information Computer Technologies cooperates with the University of Leeds in the UK, which is confirmed by joint publications (Kawakami Y., Borissova A., Chapman M., Goltz G., Koltsova E., Mitrichev I., Blacker A.J. "Continuous Flow Asymmetric Transfer Hydrogenation with Long Catalyst Lifetime and Low Metal Leaching" // Eur. J. Org. Chem. 2019. pp. 7499–7505. doi 10.1002/ejoc.201901547) and joint scientific projects (for example, British Council grant Agreement No. 2657-D-1-58/2017 dated 01.02.2017, project topic: "Combining experimental methods and mathematical modeling, including

chemical kinetics, heat and mass transfer, from the scale of atoms to the scale of the plant").

The Department of Information Computer Technologies cooperates with the Beijing Institute of Technology (contract No. 14.3-5-15/17 dated 09/29/2018) on the topic "Technology of enhanced oil recovery of oil wells based on the use of energy-intensive materials".

Students and teachers of the department actively participate in international scientific and practical conferences, symposiums, seminars.

EXTERNAL REVIEW PANEL



Gennady Veselov (Rostov-on-Don)

Review Chair, Russian expert

Review Chair, Russian expert

Doctor of Technical Sciences, Associate Professor, Director of the Institute of Computer Technology and Information Security, Southern Federal University, member of the Guild of Experts in Higher Education

Nominated by the Guild of Experts in Higher Education



Andrey Krasov (Saint Petersburg)

Deputy Review Chair, Russian expert

Candidate of Technical Sciences, Associate Professor, Head of the Department of Secure Communication Systems, St. Petersburg State University of Telecommunications named after Prof. M.A. Bonch-Bruevich, member of the Guild of Experts in Higher Education, Academician of the International Academy of Communications

Nominated by the Guild of Experts in Higher Education



Alexey Krylov (Moscow)

Panel Member, representative of employers

Deputy Director of the Department of Management of Services and Resources of data processing centers of the Department of Information Technology of the City of Moscow

Nominated by the Department of Information Technology of the City of Moscow



Vladislav Ioffe (Moscow)

Panel Member, student representative

4th year student of the Department of Information Systems and Technologies, National Research Technological University "MISIS"

Nominated by the National Research Technological University "MISiS"

COMPLIANCE OF THE EXTERNAL REVIEW OUTCOMES WITH THE STANDARDS

STANDARD 1. Policy (goals, development strategy) and quality assurance procedures of the educational programme

Compliance with the standard: partial compliance

Good practice:

Joint programs with specialized large companies are actively developing.

There is a clear strategy of the University aimed at improving the University's performance in the main areas of research and pedagogical activity.

The University has a system of further professional education, a continuous cycle from school is implemented, specialized classes are supported, teachers' trips to the regions are practiced, there is a children's technopark.

Individual educational paths are being implemented. Surveys of employers cover a wide range - more than 600 companies.

Areas for improvement:

When forming a quality assurance policy for the programs under accreditation, it is necessary to involve not only representatives of chemical and technological enterprises, but, above all, IT companies.

It is necessary to expand the opportunities for students and graduates to participate in the formation of a quality assurance policy, for example, by creating structures that unite individual groups of stakeholders and reflect their consolidated opinion – Alumni Associations, Student Councils and Employers' Associations.

It is recommended to separate the goals and objectives of bachelor's and master's degree programs. The task of the IGTA 09.00.00 is to train IT specialists, especially at the bachelor's level. The task of training specialists in automated control systems of chemical production, the creation of digital doubles, should be given on the basis of basic knowledge in the field of computer science at the bachelor's level, rather like a master's degree program, under the target order of enterprises.

It is necessary to revise the objectives of the bachelor's degree program 09.03.02 and 09.03.01 - making them closer to the content of the Federal State Educational Standard. Within the framework of the topics of the WRC, pre-graduate practices to form a team to continue their studies in the master's degree.

It is recommended to make the master's program 09.04.02 projectoriented by redistributing the study time from the repetition of bachelor's disciplines to methods of object research, team development, including methods of IT project management in the chemical industry.

STANDARD 2. Design and approval of programmes

Compliance with the standard: **partial compliance**

Good practice:

High university-wide indicators in the research and financial spheres ensure sustainable development, including non-core areas of training for the D.I. Mendeleev RCTU.

Areas for improvement:

The objectives of the bachelor's degree programs are formulated very generally and are rather similar to the objectives of these programs. It is necessary to bring them to the form laid down in the Federal State Educational Standard, satisfying both the needs of students and employers.

It is recommended to abandon the professional standard 40.008 for bachelor's degree programs, since it corresponds to the level of a specialty or master's degree, and also to reduce the total number of professional standards from 8-10 to 1-2 basic and possibly 1-2 additional, indicating specific generalized labor functions.

It is recommended to revise the content of the discipline "Information Security", which is now of a formal nature. It is advisable to consider the specifics of the industry in the structure of the educational program not from the point of view of knowledge in the field of Chemistry, which is less than that of other students of the RCTU, but from the point of view of understanding the organization of processes at the facilities of chemical enterprises belonging to critical infrastructure enterprises.

It is recommended that the bachelor's degree program be directed to the training of an IT specialist, and the solution of the problem of creating digital doubles for chemical production should be attributed to the programs of targeted training of masters.

STANDARD 3. Student-centered learning and assessment

Compliance with the standard: substantial compliance

Good practice:

The dean's office tries to take into account the opinions and complaints of students.

The program provides for the possibility of objective procedures for evaluating learning outcomes, there are intermediate points for monitoring student progress.

Students are clearly informed about the form of control and assessment used.

It is possible to take additional inter-faculty courses.

Areas for improvement:

When developing educational programs, it is recommended to expand the opportunities of students to form individual educational paths by introducing more than 2 blocks of elective disciplines containing professional disciplines aimed at forming different competencies within the framework of specific generalized labor functions of professional standards.

In order to expand the opportunities for the formation of individual educational paths, it is recommended to offer students specific online courses within the framework of work programs of disciplines, the results of which can be fully or partially credited as the results of training in the discipline.

In order to improve the independent assessment of the quality of education, it is advisable to involve university teachers who are not involved in the implementation of a particular discipline, as well as teachers from other universities and representatives of employers, in the development of procedures for conducting intermediate certification.

Although students' appeals are taken into account, but only at the dean's office level with insufficient participation of the department. It is recommended to increase the participation of the graduating department in the process of interaction with students.

STANDARD 4. Student admission, support of academic achievements and graduation

Compliance with the standard: substantial compliance

Good practice:

The University effectively operates a children's technopark, specialized classes, organized visits of teachers to the regions, which indicates a good level of career guidance work with applicants.

The University provides the opportunity to obtain a European Diploma Supplement.

Areas for improvement:

It is necessary to create conditions for students to participate in academic mobility programs by concluding appropriate agreements with Russian and foreign universities, as well as, possibly, by organizing grant support by the University for academic mobility programs for students.

To improve the competence of professional communication in English, it is advisable to include professional disciplines implemented in English in educational programs, as well as to create a system of support for students applying for participation in international academic mobility programs. It is necessary to raise students' awareness of the possibilities of obtaining a European Diploma Supplement.

STANDARD 5. Teaching staff

Compliance with the standard: **substantial compliance**

Good practice:

There is an incentives system for the teaching staff for publishing and methodological activities. There are good opportunities for the teachers of the Department to participate in research work at the junction of the main direction of the University with computer technologies.

The teaching staff involved in the implementation of the educational programs under accreditation is actively engaged in research activities, publishing research results in publications recommended by the Higher Attestation Commission and indexed in international databases. Teachers from other Russian universities are involved.

Areas for improvement:

It is necessary to more widely involve teachers with professional experience in the profile of the educational program in the implementation of educational programs. Currently, part-time teachers cannot participate in them, because they are teachers of educational organizations at their main place of work.

It is necessary to develop a system of stimulating the participation of university teachers in international projects and internships.

STANDARD 6. Learning resources and student support

Compliance with the standard: substantial compliance

Good practice:

The material and technical resources are constantly being improved with the involvement, among other things, of the income from research, and generally corresponds to the tasks being solved.

Library resources are well developed, the most popular publications are digitized and available in the digital library fund.

Students' satisfaction with the quality of education is being monitored.

Areas for improvement:

It is recommended to include disciplines in the curriculum at least on the national operating system Astra Linux, as well as to bring to students the requirements for the use of software at chemical and technological facilities. It is necessary to bring the Internet connection of students and university staff in accordance with the requirements of the Decree of the Government of the Russian Federation dated 31.07.2014 No. 758, which introduced mandatory identification of users (full name) and their equipment connected to the Wi-Fi network (MAC address).

It is necessary to organize access to education in all university buildings for students of different categories.

Students are not well aware of academic mobility programs, these problems need to be eliminated, although it is clear that they are caused by objective reasons.

STANDARD 7. Collection, analysis and use of information for managing the educational institution

Compliance with the standard: **partial compliance**

Good practice:

More than 600 enterprises participate in the feedback monitoring. This work is performed at a very high level.

Areas requiring improvement:

It is recommended to consider the concept of building a network of the Department, integrating it into the general network of the University. In fact, the Department has its own computer network.

It is recommended to periodically hold extended meetings of the departments, meetings of the University management with the teaching staff. Now the connection of the University management with the Department for accredited educational programs is not visible.

It is necessary to strengthen the role of the student council as a student self-government body

STANDARD 8. Public information

Compliance with the standard: **substantial compliance**

Good practice:

The official website of the D.I. Mendeleev University meets the requirements for the websites of educational organizations. The information on the website is regularly updated.

The procedures for working with the site are clearly regulated.

There is an English version of the site.

Areas for improvement:

It is recommended to update information about the employment of graduates, in particular within the framework of the 09.00.00 direction

"Computer Science and Computer Engineering", to add vacancies from employers.

STANDARD 9. On-going monitoring and periodicssessment of the educational programmes

Compliance with the standard: **substantial compliance**

Good practice:

The educational programs are regularly reviewed and adjusted.

Feedback is provided by testing with grading. A wide range of employers participate in the surveys.

Areas for improvement:

It is recommended to carry out a detailed collection of information indicating not only numerical estimates, but also specific recommendations for improving the educational program. Currently, representatives of a limited number of employers focused on the research sector or specialized enterprises take part in the evaluation of the reviewed educational programs.

It is recommended to finalize the regulations, including in them the possibility of finalizing individual sections of the working programs of disciplines without the need to re-approve the entire document.

STANDARD 10. Cyclical external quality assurance of the educational programmes

Compliance with the standard: **substantial compliance**

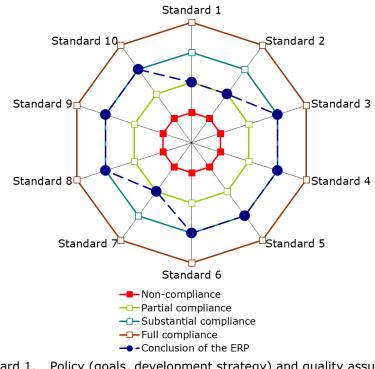
Good practice:

The University occupies very high positions in international rankings, in particular in the QS World University rankings.

Areas for improvement:

In monitoring the effectiveness of universities for 2020, the indicators E.3. International activity and E.5. Salaries of the teaching staff stand out in a smaller direction against the background of universities of the city and departments. Despite the objective problems with attracting foreign students, taking into account the specifics of the educational organization, the direction of training 09.00.00 "Computer Science and Computer Engineering" can, with the proper support of the University management, make a significant contribution to the implementation of these indicators.

DISTRIBUTION DIGRAM OF THE EXTERNAL REVIEW OUTCOMES



Standard 1. Policy (goals, development strategy) and quality assurance procedures of the educational programmes

- Standard 2. Design and approval of programmes
- Standard 3. Student-centered learning, teaching and assessment
- Standard 4. Student admission, support of academic achievements and graduation
- Standard 5. Teaching staff
- Standard 6. Learning resources and student support
- Standard 7. Collection, analysis and use of information for managing the educational institution
- Standard 8. Public information
- Standard 9. On-going monitoring and periodic assessment of the educational programmes
- Standard 10. Cyclical external quality assurance of the educational Programmes

CONCLUSION OF THE EXTERNAL REVIEW PANEL

Based on the self-evaluation report analysis, documents and data submitted the External Review Panel has come to the conclusion that the cluster of educational programmes the cluster of educational programmes «Computer Science and Computer Engineering» (09.03.01), «Information systems and technologies» (09.03.02, 09.04.02) delivered by D.I. Mendeleev Russian Chemical-Technological University **substantially comply** with the standards and criteria of public accreditation of the National Centre for Public Accreditation.

The Panel recommends that the National Accreditation Board accredit the cluster of educational programmes the cluster of educational programmes«Computer Science and Computer Engineering» (09.03.01), «Information systems and technologies» (09.03.02, 09.04.02) delivered by D.I. Mendeleev Russian Chemical-Technological University for the period of **4 years**.