



«АККРЕДИТТЕУ ЖӘНЕ РЕЙТИНГТІҢ  
ТӘУЕЛСІЗ АГЕНТТІГІ» КЕМ

НУ «НЕЗАВИСИМОЕ АГЕНТСТВО  
АККРЕДИТАЦИИ И РЕЙТИНГА»

INDEPENDENT AGENCY FOR  
ACCREDITATION AND RATING

# REPORT

results of work of external commission of experts on assessment  
on a compliance with requirements of standards of specialized  
accreditation to the educational program

8D07101 – Nanotechnologies in engineering  
Karaganda industrial university

the period from April 13 to April 15, 2022.

**INDEPENDENT AGENCY FOR ACCREDITATION AND RATING**  
*External commission of experts*

*Addressed  
To accreditation  
to council of IAAR*



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**Temirtau, 2022**

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**(I) LIST OF DESIGNATIONS AND REDUCTIONS**

**AIS** – the automated information system  
**AC** – Academic calendar  
**DB** – Basic disciplines  
**SMSPE** – State obligatory standard postgraduate formations  
**DAP** – Department on the academic policy  
**DPW&YP** – Department on educational work and youth policy  
**MS DS&IS** – Department of science, innovations and international cooperation  
**DDT** – Department of digital transformation  
**ECTS** – European Credit Transfer System  
**ICT** – Information and communication technologies  
**IEP** – Individual curriculum of work of the doctoral candidate  
**KarIU (KSIU), university** – NLC "Karaganda industrial university"  
**KV** – Component for choice  
**WHO** – Credit technology of training  
**CED** – the catalog of elective disciplines  
**LEPED** – Laboratory of an engineering profile  
**MES RK** – Ministry of Education and Science of the Republic of Kazakhstan  
**The MEP** – the modular educational program  
**SRW** – research work  
**SRWD** – research work of the doctoral candidate  
**STC** – Scientific and technical council  
**TCO** – Office of commercialization of technologies  
**MF** – Metal Forming  
**OP, EP** – Educational program  
**TS** – the faculty staff  
**PS** – professional standards  
**RK** – the Republic of Kazakhstan  
**RHO** – results of training  
**RUP** – Working curriculum of the educational program  
**CAD** – the computer-aided engineering system  
**SMK** – a quality management system  
**IWD** – independent work of the doctoral candidate  
**IWDT** – independent work of the doctoral candidate with the teacher  
**StO** – the standard of the organization  
**PMS** – Service of personnel management  
**CVD** – chemical vapor deposition  
**It is TEP** – the standard curriculum  
**EMCD** – an educational and methodical complex  
**EMCD** – an educational and methodical complex of discipline  
**EMC** – Educational and methodical council  
**WOS** – Web of Science

## **(II) INTRODUCTION**

According to order No. 26-22-OD of 03.02.2022. The independent agency of accreditation and rating from April 13 to April 15, 2022 the external commission of experts carried out the assessment of compliance of the educational program 8D07101 – Nanotechnologiesengineering of the Karaganda industrial university (Temirtau) to standards of specialized accreditation of IAAR (No. 10-17-OD of February 24, 2017, edition fifth).

The report of the external commission of experts (ECE) contains assessment of the provided educational programs to criteria of the IAAR standards, the recommendation of EEC about further improvement of educational programs and parameters of a profile of educational programs.

### **Structure of EEC on a cluster 1:**

**1. Chairman of the commission of IAAR – Vladimir Nikolaevich Kosov, d.f-m.s,** professor, Abai Kazakh National pedagogical university;

**2. Expert of IAAR – Guzal Amitovna Ismaylova,** the doctor of PhD, the associated professor Al-Farabi Kazakh National University;

**3. Employer IAAR – Leila Maratovna Zhanspayeva** Department of personnel management of Chamber of businessmen Nur-Sultan (Nur-Sultan);

**4. Student of IAAR – Arystan Aydana** doctoral candidate of EP "Nanotechnologies" Kazakhstan-British technical university (Almaty);

**5. The coordinator from the Agency – Gulfiya Rivkatovna Nazyrova, c.e.s.,** the project manager on forming external expert the commission of IAAR.

### (III) REPRESENTATION OF EDUCATION TO THE ORGANIZATION

Non-profit joint-stock company "Karaganda Industrial University" (further NLC "KarIU") — the leading higher education institution of Kazakhstan on training of highly qualified personnel with the higher and postgraduate education on metallurgical, machine-building, chemical, construction and to other directions accompanying metallurgy which are priority for the mining and metallurgical industry of the Republic of Kazakhstan .

By NLC "KarIU" it is reorganized according to the Decree of the Government of the Republic of Kazakhstan of October 11, 2019 No. 752 "About some questions of higher educational institutions of the Ministry of Education and Science of RK" from the Republican state enterprise on the right of economic maintaining "The Karaganda state industrial university" (the Plant earlier – the technical college at the Karaganda metallurgical plant created on the basis of branch of the Karaganda polytechnical institute in 1963).

The university carries out preparation according to 51 educational program (EP), including: 25 OP bachelor degrees, 24 OP magistracies and 2 OP doctoral studies.

3 faculties, 11 departments and 1 scientific structural unit – DS, IandIR are a part of the university.

NLC «Karaganda industrial university» conducting higher education institution among the educational institutions which are carrying out training on technical specialties in this connection popular among employers of metallurgical and machine-building productions. Has good reputation, thanks to the activities for improvement of quality of the provided educational services and increase in research potential, improvement of indicators for the academic reputation, reputation among employers, to citing, a ratio of students to the faculty.

2021 the university has taken the 15th position in General rating TOP-20 of higher education institutions of RK of the Independent agency for accreditation and rating.

the National rating of the best technical colleges of Kazakhstan of the Independent agency on quality assurance in education in 2021 – the 9th position.

The contingent of students of the university at the time of accreditation. The contingent of students of day form of education for March 28, 2022 makes only 1049 people, of them: on the basis of the state educational grant – 808. Students of remote form of education – 687, evening form of education – 35. Undergraduates – 62, from them by the state order 40, doctoral candidates – 13, from them by the state order 13.

The regular structure of the university (for 01.09.2021): The number of regular teachers at the university for 01.09.2021 is 126 people; from them 8 doctors of science, 37 candidates of science, PhD - 13, masters – 49 people. Middle age TS on higher education institution of 49 years. The Ostepenennost of regular teachers – 46%.

Owners of a grant according to the Bolashak program-3.

The contingent of students of the accredited OP 8D07101 - Nanotechnologies in engineering for January 01, 2022 makes 4 students on all courses.

Now training of doctoral candidates on OP 8D07101 - Nanotechnologies in engineering it is carried out on the basis of license No. KZ86LAA00019217 of October 30, 2020 granted by Committee on control in sphere of formation and science of the Ministry of Education and Science of the Republic of Kazakhstan of October 29, 2020 No. 426.

The releasing department on OP 8D07101 - Nanotechnologies in engineering is the Metal Forming department.

Now the Metal Forming department is structural unit of faculty "Metallurgy and mechanical engineering".

Information on Metal Forming department

The Metal Forming department has been created in 1964.

The department trains bachelors on OP 6V07201-Processing of materials by pressure, 6B07108 - Press forging in mechanical engineering, 6B07501 – Standardization, metrology and certification, masters on OP 7M07101 – technology of processing of new structural materials and doctors of philosophy for OP 8D07101 - Nanotechnologies in engineering.

Training at department is conducted in the Kazakh and Russian languages and from 2018 academic year polylingual groups are open. Training in doctoral studies in OP 8D07101 - Nanotechnologies in engineering (6D074000 Nanomaterialy and nanotechnologies) has begun in 2010. According to the qualifier of specialties to graduates PhD degree is awarded. The term of training in this OP is 3 years.

The mission of the Metal Forming (MF) of Faculty of Metallurgy department and mechanical engineering (FMiM) consiststraining of the highly qualified competitive personnel demanded in labor market in general across the Republic of Kazakhstan.

According to the rating of the Independent agency for accreditation and rating (IAAR) according to educational programs according to the directions and levels of training of specialists in OP 8D07101 - "Nanotechnologies in engineering" takes 1 place across the Republic of Kazakhstan .

*Qualitative and quantitative list of teachers of department:*

As a part of MF department in 2021-2022 8 TS, ostepenennost percent - 75% conducting classes in OP – 100%, from them work: the c.t.s. – 2, PhD – 4 both 1 master and 1 engineer. Middle age TS on department – 46.6 years.

*Employment of graduates of the last three years on the accredited OP 8D07101 - Nanotechnologies in engineering makes 100%.*

*Research, economic contractual projects on department in a section of the accredited OP:*

*Performance of the SRW financed from the government budget:*

1. Development of theoretical bases of realization of the innovative combined processes of deformation of non-ferrous metals and alloys for the purpose of receiving an ultrafine grain structure. 2022-2024, GF MES RK.

Besides, it is given TS of department 4 applications for grant financing for 2022-2024 are submitted:

1. "Development and a research of the combined technology of thermo mechanical processing of a corrosion-proof wire;
2. Development of complex technology of processing and utilization of industrial and household waste for the purpose of creation of new construction materials;
3. Development of technology and a development type of the device for thermo frictional processing of titanium alloys in military industry;
4. Development and a research of the innovative way of rolling with macro shift providing the high-quality thick sheet from non-ferrous metals and alloys.

*Performance of not financed SRWs for the accredited period:*

1. Improvement of quality of hardware products. Development of the production technology of a range of wire products in the conditions of KAZ-METIZ LLP. 2017-2019.

#### **(IV) DESCRIPTION OF THE VISIT OF EEC**

Work of EEC was carried out on the basis of the approved Visit schedule of commission of experts on primary specialized accreditation of educational programs at the Karaganda industrial university the period from April 13 to April 15, 2022.

For the purpose of coordination of work of EEC the adjusting meeting during which powers between members of the commission have been distributed has taken place on April 11,

2022, the schedule of a visit is specified, consent in questions of the choice of methods of examination is reached.

For obtaining objective information about quality of educational programs and all infrastructure of higher education institution, specification of contents of reports on a self-assessment meetings with the rector, vice rectors of higher education institution on activities, the heads of structural units, deans of faculties managing departments, teachers, students and online a meeting with employers have taken place. In total 31 representatives (table 1).

Table 1 - The information about the employees and students who have participated in meetings with EEC IAAR:

<b>Category of participants</b>	<b>Quantity</b>
The chairman of the board - the Rector	1
Vice-rectors	2
Heads of structural units	13
Deans	2
Managers of departments, heads of OP	3
Teachers *	13
Students *	13
Employers *	13
<b>In total</b>	<b>60</b>

During the online excursion the members of EEC have got acquainted with a condition of material and technical resources, have visited the museum of the university, laboratory of department :

- Laboratory of collective use of "Electronic miikroskopiya and nanotechnology": a probodgotovkathe chemical analysis, optical microscopy, the scanning microscopy and the translucent microscopy;
- Industrial and production site (B-housing);
- laboratory of the MF modern methods;
- laboratory of sample preparation;
- laboratory of forge and press and rolling mill equipment (A-housing).

At EEC IAAR meetings with target groups of a KarIU the specification of mechanisms of implementation of policy of higher education institution and a specification of the separate data provided in the report on a self-assessment of higher education institution was carried out.

14.04.2022 (time of visit 15:10 - 16:00) have examined research work of the doctoral candidate of NvI-20 group Tuyskhan Kurmetbeka under the scientific management of PhD, G.E. Akhmetova.

During an operating time the members of EEC have visited divisions of base of practice of JSC ArselorMittal Temirtau: Metallurgical Science and Defectoscopy laboratory, laboratory of electric equipment of rolling shops of TsZETL, service of automatic equipment and automatic CGCA electric drives, site of automatic equipment of the sortoprokatny shop.

According to the procedure of accreditation the online questioning of 17 teachers, 13 students has been carried out.

For the purpose of confirmation of information provided in the Report on a self-assessment by external experts the work documentation of the university has been requested and analyzed. Along with it, experts have studied Internet positioning of the university by means of the official site of higher education institution of <https://ttu.edu.kz/>.



Within the planned program of the recommendation about improvement of the accredited educational programs of a KarIU, the developed EEC following the results of examination, have been presented on a meeting with the management of 15.04.2022.

**(V) DESCRIPTION OF THE PREVIOUS PROCEDURE OF ACCREDITATION**

Accreditation of OP OP 8D07101 - Nanotechnologies in engineering it is carried out for the first time.



## (VI) COMPLIANCE TO STANDARDS OF SPECIALIZED ACCREDITATION

### 6.1. Management of the Educational Program standard

- ✓ *The higher education institution should have the published policy of quality assurance.*
- ✓ *The policy of quality assurance should reflect communication between scientific research, teaching and training .*
- ✓ *The higher education institution should show quality assurance cultural development, including in OP coal mine.*
- ✓ *The commitment to quality assurance should belong to any activity which is carried out by contractors and partners (outsourcing) including at realization of joint/two-degree education and the academic mobility.*
- ✓ *The management of OP provides transparency of development of the development plan for OP on the basis of the analysis of its functioning, real positioning of higher education institution and orientation of its activity on satisfaction of needs of the state, employers, interested persons and students.*
- ✓ *The management of OP shows functioning of mechanisms of forming and regular revision of the development plan for OP and monitoring of its realization, assessment of achievement of the goals of training, compliance to needs of students, employers and society, the decision-making directed to continuous improvement of OP.*
- ✓ *The management of OP should involve representatives of groups of interested persons, including employers, students and TS in forming of the development plan for OP.*
- ✓ *The management of OP should show identity and uniqueness of the development plan for OP, its consistency with national priorities of development and the development strategy of the organization of education.*
- ✓ *The higher education institution should show accurate definition responsible for business processes within OP, unambiguous distribution of functions of personnel, differentiation of functions of collegial bodies.*
- ✓ *The management of OP should produce the evidence of transparency of a control system of the educational program.*
- ✓ *The management of OP should show successful functioning of an internal system of ensuring quality of OP including its design, management and monitoring, their improvement, decision-making on the basis of the facts.*
- ✓ *The management of OP should exercise risk management.*
- ✓ *The management of OP should provide participation of representatives of interested persons (employers, TS, students) as a part of collegial bodies of management of the educational program and also their representativeness at decision-making concerning management of the educational program.*
- ✓ *The higher education institution should show management of innovations within OP, including the analysis and introduction of innovative offers .*
- ✓ *The management of OP should show proofs of openness and availability to students, TS, employers and other interested persons.*
- ✓ *The management of OP should be trained according to programs of management of education .*
- ✓ *The management of OP should aspire to that the progress made since the last procedure of external quality assurance was taken into account by preparation for the following procedure.*

### **Evidential part**

The Karaganda industrial university (KarIU) pursues policy on quality assurance which is a part of its strategic management and is aimed at quality providing the educational services provided to consumers and customers. The policy of ensuring quality of a KarIU proceeds from the Mission of the university (<https://tttu.edu.kz/abuniv/qms/mission/>) directed to preservation and strengthening of a role of a KarIU as the leading university providing the advancing training of new generation of specialists of a technical profile of the mining and metallurgical industry of the Republic of Kazakhstan and is reflected in the documents "Policy in the field of Quality" (<https://tttu.edu.kz/abuniv/qms/politics/>), "The purpose area of quality" (<https://tttu.edu.kz/abuniv/qms/aims/>), "The strategic plan of NLC "Karaganda industrial university" for 2021-2025" (<https://drive.google.com/file/d/1mSIFx-MkqJgLCIyZ5MMla-Zp6bAqMfJj/view>), "A comprehensive plan of development of the university for academic year". The management of OP (acting through the head of the department) develops and introduces policy on quality assurance by means of the relevant structures and processes with involvement of external interested parties.

Availability of the main documents of policy of quality assurance TS, to workers and students, is provided with placement them on the website of the university (<https://tttu.edu.kz/>) and at stands of structural units and departments. Placement of documents of policy of quality assurance on open resources allows to get acquainted with them to employers and other interested persons.

Interviewing of the management of higher education institution, structural units, deans and managers of departments has shown interest in ensuring quality of management, educational and scientific activity, increase in its culture due to use of a system of mechanisms of motivation, account and control. Quality assurance is defined by internal standards, monitoring is carried out by means of internal and external audits. Internal audit is regulated by the corresponding procedure and is carried out once a year. External audit is booked by the certifying company once in 5 years.

The development plan for OP corresponds to the mission of the Karaganda industrial university, the purposes and tasks of the Development strategy of the university till 2024.

The transparency of development of OP is provided with extensive discussion at the levels of department, faculty and university in general, the program and the plan of its development are available to acquaintance on the website, representatives TS, students and employers are familiar with it what the results of an interview which are carried out with them during work as EEC testify to.

Managements of OP includes the following main stages: the constant analysis of the current state of nanotechnologies in RK and beyond its limits, the analysis of labor market of his requirements in the direction of preparation, forming of the purpose, problems of OP and directly OP, discussion of maintenance of OP with interested inside (TS, doctoral candidates and a DAP) and external (stakeholders/employers and experts from the academic circles) at faculty meetings and by e-mail. Stakeholders make the proposals on forming of OP. (For example, according to the recommendation of employers the new discipline of "Top management in production" has been brought in OP for study by doctoral candidates.) Further, ready MEPs send for reviewing and examination to representatives from production and higher education institutions including external. The strategy of OP is formed within internal documents of department – the Development plan for OP where the main aspects of the development strategy OP including risks, and the Development plan for department which, in turn, are formed taking into account "Policy in the field of quality" (<https://tttu.edu.kz/abuniv/qms/politics/>), "The purpose in area of quality" (<https://tttu.edu.kz/abuniv/qms/aims/>), "The strategic plan of NLC "Karaganda industrial university" for 2021-2025" (<https://drive.google.com/file/d/1iKjHjZ9i-MEpXjq58X7Nx44LEMn2LOdv/view>) and also "A comprehensive plan of development of the university for academic year" are stated.

Information on participation of representatives of interested persons (employers, TS, students) as a part of collegial bodies of management of the educational program is taken out on title pages of the MEP where information on the structure of the working group contains.

Employers, doctoral candidates participated development the MEP, a CED. <https://drive.google.com/file/d/16Q3pW2Z9nnXduk14kKbgxPoZhFYriZO/view?usp=sharing>.

The management of OP annually analyzes, overworks and introduces the innovative offers arriving from all interested parties – employers, TS, students and MON. So, for example, according to the recommendation the MES RK in 2021 has been included in the maintenance of the MEP as obligatory the Academic Letter component and also according to the recommendation of the employer as a component the discipline "Production top management" has been for choice included. Innovative results of scientific research take root into educational process ([https://drive.google.com/file/d/1IUhfV-fosWwUrGn5\\_DGhC3RkoEX7Flz1/view?usp=sharing](https://drive.google.com/file/d/1IUhfV-fosWwUrGn5_DGhC3RkoEX7Flz1/view?usp=sharing); [https://drive.google.com/file/d/12DD\\_6kcSf2Nx0SSVsvim0TojtDHbzEJE/view?usp=sharing](https://drive.google.com/file/d/12DD_6kcSf2Nx0SSVsvim0TojtDHbzEJE/view?usp=sharing)).

The transparency of a control system and functioning of an internal system of quality

assurance is provided at all levels, since department and finishing with the Board of directors ([https://tttu.edu.kz/corporate\\_governance/](https://tttu.edu.kz/corporate_governance/)). At each level - design, management, monitoring and adoption of the relevant decisions the subjective factor is excluded, each issue is resolved jointly – with involvement of the relevant commission. (For example, all reports on SRW of doctoral candidates are checked for lack of plagiarism, written examinations in the presence of the commission listen with delight at scientific seminars of department in the presence of the dean, and).

Transparency of a control system of OP 8D07101 - The TS, scientists and employees of a KarIU, students, entrants, employers, graduates of a KarIU, state bodies, public organizations, media and other interested parties are guaranteed to nanotechnology in engineering by information on activity of heads, on heads of higher education institution and OP, on the made decisions of collegial and corporate bodies by providing. For this purpose the management of OP is used by all communication channels: website of the university (<https://tttu.edu.kz/>), AIS "Platonus", LMS Moodle, social networks, information stands, media, days of "Open doors", excursions, personal contacts with interested parties, etc.

Distribution of responsibility for business processes within management of OP are accurately painted in the duty regulations developed according to SMK STO II.5-03.01-2022 "Duty regulations" and SMK P 4 - 20-2020 the Provision "About Qualification Characteristics of Positions of Scientific and Pedagogical Workers". Differentiations of functions of collegial bodies are regulated by the relevant corporate documents ([https://tttu.edu.kz/corporate\\_governance/](https://tttu.edu.kz/corporate_governance/)).

The KarIU there is an exhaustive database of internal normative legal acts regulating all main business processes within OP. The administrative personnel and authorized persons responsible for functioning and development of SMQ in structural units of higher education institution have access to this base.

The external normative legal acts regulating the main business processes within OP are documents of direct action or they are overworked and adapt to real conditions of higher education institution and to concrete business processes, and receive the status of the adapted internal documents. The changes made to the normative legal acts issued by authorized public authorities involve change of the list and contents of the documents regulating business processes within OP.

The main risks in the accredited OP are the risks directly related to students to which the university tries to react quickly:

- a possibility of absence on protection – at identification of this risk at the university with the "lagging behind" doctoral candidate various events of consulting character are held: information on the held seminars on acquisition of skills of writing of qualitative scientific articles and publications in rating magazines is regularly provided;

- the absence at the potential entrant of the certificate confirming knowledge of a foreign language at the required level – for an exception of this risk the university beforehand (in 8-12 months prior to entrance examinations) begins active personal career guidance among potential entrants. Key requirements for receipt, in particular, need of existence of the certificate confirming knowledge of a foreign language at the required level are explained to them. As a result future doctoral candidates have an opportunity and time for high-quality preparation and passing an examination of IELTS, TOEFL, etc.

These mechanisms of identification and elimination of risks are rather effective that is confirmed by the fact that for the last 3 years it is annually recruited on this OP. The university constantly reveals, analyzes and evaluates potential risks for the organization and for its separate types of activity, criteria, frequency of the analysis of risk management and also measures for prevention/minimization of risks are described in SMQ StO II.6-01.02-2022 "Actions concerning risks". According to the reference are available the report on risks for 2020-2021 and the register of risks for 2021-2022

([https://drive.google.com/file/d/1Oc6DbmWiSnfl\\_axFii93Jqtu6WmG2Lud/view?usp=sharing](https://drive.google.com/file/d/1Oc6DbmWiSnfl_axFii93Jqtu6WmG2Lud/view?usp=sharing)).

From the existing similar OP in RK only in ENU of L.I. Gumilev on the website there is a development plan for OP (<https://ftf.enu.kz/storage/8D07140-NPh-dev-plan-2021-2024.PDF>). The identity uniqueness of the development plan for the accredited OP unlike the aforesaid consists in definition of the concrete measurable indicators expressed in numerical indicators.

The openness and availability of the management of OP for TS, students and other interested persons is provided with placement of information on the website of the university, a possibility of addresses on the blog by the rector, by means of e-mail of messages to the rector, vice rectors, the dean, the head of the department a Metal forming. Questioning of students during the visit of EEC has shown that an overwhelming part of students are in whole or in part satisfied with availability of the management and services:

- The relations with dean's office (school, faculty, department) - 100%;
- Level of availability of dean's office (school, faculty, department) - 100%;
- Level of availability and responsiveness of the management (higher education institution, school, faculty, department) - 92.3%;
- Availability of the academic consultation - 92.3%;
- Availability of consultation on personal problems – 76.9%.

When interviewing it is established that the management of OP acting through the manager of Metal forming department Akhmetova G.E. was trained according to the program of management of education.

### ***Analytical part***

On the basis of the analysis of the policy of quality assurance published on the website of the university it is possible to conclude that this document reflects communication between scientific research, teaching training (acts of introduction, certificates, editions, publications).

Having studied contents of the submitted normative documents, the commission draws a conclusion about rather high culture of quality assurance which is supported by the system of internal standards and the mechanism of monitoring. The system of quality assurance covers all spheres of activity of higher education institution, is supported by necessary standard documentation.

The position of higher education institution and OP in various international and republican ratings, results of poll of students and employers, their questioning, studying development plans for OP, reports, minutes of Metal forming department confirms transparency of development of OP, indicates successful functioning of the mechanism of development, the statement and monitoring and entering of amendments into development plans for OP, their compliance to expectations of students and employers, to state programs of Kazakhstan and a MES RK in the field of education. At the same time it should be noted that the list of professional standards is not determined by the accredited OP, the detailed analysis on compliance of professions, labor functions of professional standards with results of training in disciplines of the educational program (indicators of achievement of the RHO) is not carried out; abilities, skills on PS with the formed results of training within OP, a date of performance by September, 2022. The purpose of OP can belong to any other educational program as has no distinctive features that excludes specifics of OP, the name OP should consider how current trends of development of professional activity and own original directions of researches, well attractive to applicants and employers.

The existing mechanism of development of the development plan for OP allows interested parties from number TS, students and employers to participate in its creation, providing his identity due to use of author's courses, continuous updating of material and technical resources, the unique laboratory equipment. However, during interviewing among students it has become clear that in dissertation work of the doctoral candidate of the first course as method of obtaining

grapheme structures the CVD method which is absent in scientific laboratories of the university is. In this regard, the management of the university is recommended to develop the plan of measures according to the solution of the matter by the beginning of academic year 2022/2023. Also, results of an interview among students about satisfaction with availability level with the available scientific laboratories are made by 76.9%.

Responsible for business processes within OP and distribution of duties of personnel are defined by regulations on structural units, duty regulations. Results of an interview and questioning of the deans managing departments, TS have shown good understanding of the duties and ability to carry out them, to be guided in management of OP.

Good results (100%) of distribution of graduates, the responses of employers, satisfaction of students and graduates defined on the basis of polls and questioning allow to make the conclusion about successful functioning of quality assurance in management of OP.

It is necessary to evaluate activities of the management of OP for ensuring participation of representatives of interested persons as a part of collegial bodies of management of the educational program and also their representativeness at decision-making concerning management of the educational program. At the university a number of collegial bodies are engaged in management of OP: The academic council, the commissions on ensuring quality of faculty, department on the academic policy, the working groups with participation of employers whose activity and structure is regulated by internal normative documents. Teachers of higher education institution, representatives of students, employers who as show protocols including faculty meetings, directly take part in development and management of OP are their part.

When studying documents of the academic commission of faculty, the structure of the working group of OP developers, the minutes of department, presence of representatives in them TS, students and employers who directly participate in coordination necessary at management of OP is noted: development plans, CEDs, RUPAKH, etc. The transparency is provided with placement these documents on the website of higher education institution, faculty and department. Activity of faculty and department is reflected in Instagram, Facebook, VKontakte.

Especially it should be noted the organization of openness and availability to stakeholders of OP. Level of availability of the management has satisfied more than 90% of participants of poll.

On the submitted documents it is established that the head of the department – the head of OP was trained on education management.

***Strengths / the best practice on EP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

***Recommendations for EP 8D07101 – Nanotechnologies in engineering:***

- reconsider and update in the register: OP purpose in terms of identity, uniqueness and relevance of OP, considering requirements of modern labor market. Correct the formed results of training of OP, they should be achievable and commensurable a date of performance by September, 2022;

- for productive risk management the management of OP needs to execute a complex of actions, namely: determine the list of the professional standards (PS) by the accredited OP; carry out compliance of professions, the PS labor functions with results of training in disciplines of the educational program (indicators of achievement of the RHO); abilities, skills on PS with the formed results of training within OP a date of performance by September, 2022;

- provide management of innovations within OP, including the analysis and introduction of innovative offers. Define mechanisms of support and stimulation of initiatives of

commercialization of the scientific projects having innovative focus **during all period of validity of accreditation.**

***EEC conclusions by criteria :***

According to the Management of the Educational Program standard the educational program 8D07101 – *Nanotechnologies in engineering* has 16 satisfactory positions and 1 assumes improvement.

**6.2. Management of Information and Reporting standard**

- ✓ *The higher education institution should provide functioning of a system of collecting, the analysis and management of information on the basis of modern information and communication technologies and software.*
  - ✓ *The management of OP shows system use of the processed, adequate information for improvement of an internal system of quality assurance.*
  - ✓ *The management of OP shows existence of the reporting system reflecting activity of all structural units and departments within OP including assessment of their effectiveness.*
  - ✓ *The higher education institution should define frequency, forms and methods of assessment of management of OP, activity of collegial bodies and structural units, the top management.*
  - ✓ *The higher education institution should show the mechanism of ensuring information security, including definition of responsible persons for reliability and timeliness of the analysis of information and providing data.*
  - ✓ *The higher education institution shows involvement of students, workers and TS in processes of collecting and the analysis of information and also decision-making on their basis.*
  - ✓ *The management of OP should show existence of mechanisms of communication with students, workers and other interested persons, including resolutions of conflicts.*
  - ✓ *The higher education institution should provide measurement of degree of satisfaction of requirements TS, personnel and students within OP and to show proofs of elimination of the found shortcomings.*
  - ✓ *The higher education institution should evaluate effectiveness and efficiency of activity, including in OP coal mine.*
- The information collected and analyzed by higher education institution within OP should consider:*
- ✓ *key performance indicators;*
  - ✓ *to the loudspeaker of the contingent of the forms and types studying in a section;*
  - ✓ *level of progress, achievement of students and assignment;*
  - ✓ *satisfaction of students with realization of OP and quality of training in higher education institution;*
  - ✓ *availability of educational resources and systems of support to students;*
  - ✓ *employment and career development of graduates ;*
  - ✓ *Students, employees and TS should document the consent to processing of personal data.*
  - ✓ *The management of OP should promote all necessary information in the respective areas of sciences.*

***Evidential part***

Management of information in a KarIU represents activities for forming, processing, transfer and use of information within the organization and out of it. Providing full, impartial, objective, exact and available information to all interested persons about activity of a KarIU it is carried out according to the internal document SMK P-4-27-2019 "The provision on informing the public". Processes management of information within a KarIU is regulated by the standard of II.7-04.02-2021 SMK STO organization "Internal informing" (<https://tttu.edu.kz/abuniv/qms/>). Processes of internal informing are provided with administrative documentation, its structure is defined by competence of the organization, order of the solution of questions, volume and the nature of bonds between divisions of a KarIU.

the university the local uniform information network which is turning on all computers, information resources (web portals, the file servers) which allow to operate effectively educational process and all information resources is created. In all housings of the university the access to wireless network Wi-fi with Internet connection is provided.

Ensuring effective information support of management processes of an education system

and also control of educational process of higher education institution is exercised of the AIS systems "Platonus" and LMS "Moodle" which solve a complex of problems of the following directions:

- improvement of quality of rendering educational services on the basis of improvement of information and technical support of activity of higher education institution, its personnel and students of various level;
- increase in knowledge of students of higher education institution concerning conducting educational process and also implementation of activity in education on the basis of a possibility of electronic interaction with the appropriate authorized bodies.

For management of information resources of library of a KarIU according to SMQ StO II.7-01.02-2020 "Management of information resources of library" the permit Kazakh automated library information system of automation of KABIS libraries, developed by the Kazakh Soft company (<http://kabis.kz/>) is used. This system (version of KABIS of Standard) is intended for full automation and systematization of process of completing and processing of fund of library, creation of databases of electronic catalogs and ensuring information search in them. The system is realized with observance of the existing RK standards on library science. In the KABIS system the full support of the alphabet of Kazakh. Only this system can automatically put down author's signs for books in the Russian and Kazakh languages.

a KarIU the order of ensuring information security is defined, including responsible persons for reliability and timeliness of the analysis of information and providing data are defined. The documentary measures of management of information security providing trust of stakeholders and also storage use and protection of personal data of students and staff of the university are defined in the documents "Provision on Department of Digital Transformation" and in SMK P4-27-20 "The provision on informing the public". The policy of information security defines requirements in the following fields of ensuring information security: policy of network safety; password policy; policy of protection of servers; anti-virus policy; rules of Internet access.

The safety of information is ensured by structural unit of the university under the leadership of the board member – the vice rector for strategic development – the Department of Digital Transformation (DDT) incorporating the Sector of maintenance of information technologies and polygraphy and the Sector of technical support. The DDT is responsible for working capacity and constant improvement of the servers intended for storage and information processing .

For ensuring information security the access to an AIS of "PLATONUS" is provided through the login and the password issued by Office of the registrar. Level of access to bases is established depending on the functions which are carried out by the user.

Backup of information of the website of a KarIU is made through storages of the copy on remote servers of service provider of a hosting. The Platonus AIS databases it is reserved by duplication on RAID 2. Mirror copying is created after updating of a system.

Assessment of reliability of data is carried out on the basis of the Provision on ensuring the academic honesty in NLC by "KarIU" of <https://drive.google.com/file/d/1ZjRH-zMHjTa9xFiwxDJ9egG6vqzahCqN/view?usp=sharing>.

The main communication channels in a KarIU are: direct communication (educational process, meetings, meetings, personal meeting, round tables, etc.), local network (NetSpeakerPhone), Internet (website of the university, e-mail, social networks, AIS of Platonus, LMS Moodle), phones, media (newspapers, magazines, television).

Access to the international scientific Scopus and Web of Science databases to a KarIU is provided a MES RK at the expense of the funds allocated from the government budget. In a KarIU the training seminars of the Elsevier and Clarivate Analytics companies on use of resources and methods of work in the abstract and bibliographic, scientometric (bibliometrichesky) Scopus and Web of Science databases are regularly held.



***Analytical part***

On the basis of the analysis of data on structural units and the applied EEC resources concludes that at the university the control system of information which due to use of modern ICT, educational portals, the websites and platforms allows to systematize functions and to successfully carry out collecting, storage and the analysis of information, to provide its adequacy.

Studying minutes of meetings, plans and reports of department has shown that the analysis of information and the made decisions are directed to improvement of OP. The reporting system applied in higher education institution provides sufficient frequency, monitoring and control of adequacy and reliability of the results reflected in them, allows to carry out their assessment and to evaluate activity of all structural units and collegial bodies.

The used systems of document flow and the automated information system widely are applied by various organizations and higher education institutions and provide information security, timeliness of data acquisition and their processing. At the same time it should be noted that the algorithm of actions for providing with all necessary information in the respective areas of sciences on the accredited OP is not documented.

the university, communication mechanisms, widespread in most higher education institutions, with students and workers, attraction them are used to processes of collecting and the analysis of information, decision-making by means of participation in collegial bodies and questioning. Satisfaction with the level of return coupling with the management and the system of solution to the conflicts by results of questioning during work of EEC 100% (very well - 47.1%) have expressed TS, the level of the involvement into adoptions of management and strategic decisions – 94.1% (it is very good - 35.3%).

As have shown the provided samples of the filled-in application forms, standard for the KarIU, arriving and also the contracts with employees training and TS document the consent to processing of personal data.

On the basis of the analysis of contents of operational plans and annual reports of departments the compliance to the standard on structure and the maintenance of the measured indicators is established: dynamics of the contingent of the forms and types studying in a section; level of progress, achievement of students and assignment; satisfaction of students with realization of OP and quality of training in higher education institution; availability of educational resources and systems of support to students; employment and career development of graduates.

Library stock, availability of base of external electronic libraries. Provide to the databases Web of Science, Scopus TS access to scientific information that the TS are confirmed by data of questioning, by results of which the satisfaction in this question was expressed by 100% (very well - 29.4%).

***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- develop an accurate algorithm of actions for providing with all necessary information in the respective areas of sciences on the accredited OP (the latest developments, competitions and grants on scope of a research, training foreign and within the country, etc.) a date of performance by **September, 2023**.

**EEC conclusions by criteria :**

According to the Management of Information and Reporting standard the educational program 8D07101 – *Nanotechnologies in engineering* has 17 satisfactory positions.

**6.3. Development and Approval of the Educational Program standard**

- ✓ *The higher education institution should show existence of the documentary procedure of development OP and its statement at the institutional level.*
- ✓ *The higher education institution should show compliance to the developed OP to the established purposes and the planned results of training .*
- ✓ *The management of OP should define influence of disciplines and professional the practician on forming of results of training.*
- ✓ *The higher education institution can show existence of model of the graduate of OP describing results of training and personal qualities.*
- ✓ *The qualification appropriated on end of OP should be accurately defined, explained and correspond to the HCK, QF-EHEA certain level.*
- ✓ *The management of OP should show the modular structure of the program based on the European system of translation and accumulation of the credits (ECTS) to provide compliance of OP, its modules (according to the contents and structure) to goals with orientation to achievement of the planned results of training.*
- ✓ *The management of OP should provide compliance of maintenance of subject matters and results of training each other and to the training level (bachelor degree, a magistracy, doctoral studies).*
- ✓ *The management of OP should show conducting external examinations of OP.*
- ✓ *The management of OP should produce the evidence of participation of students, TS and other stakeholders in development of OP, ensuring their quality.*
- ✓ *The management of OP should show positioning of OP in the educational market, (regional/national / international), its uniqueness.*
- ✓ *Important factor is the possibility of training of students for professional certification.*
- ✓ *Important factor is existence of two-degree OP and/or joint OP with foreign higher education institutions.*

***Evidential part***

the university the procedure of development of OP and its statement at the institutional level is documented. Development and the approval of educational programs is carried out on the basis of and according to SMQ P 4-25-1-2021 "The provision on development of modular educational programs" (<https://ttu.edu.kz/abuniv/qms/polozheniyaprovisions-erezheler/>) where the procedure of development and the statement of the MEP is described.

The management of OP 8D07101 - "Nanotechnologies in engineering" defines influence of disciplines and all types the practician on forming of results of training of doctoral candidates. The maintenance of OP and also the sequence of its realization corresponds to both regulatory requirements, and modern inquiries of labor market. As passing pedagogical and research the practician is OP 8D07101 component - "Nanotechnologies in engineering", their organization and passing is carried out according to SMQ P 4-54-2022 the Provision on an order of the organization and carrying out student teaching of undergraduates and doctoral candidates (<https://drive.google.com/file/d/1MttHqVr9G0fpcCPhUx8JcxQ9hqvLgfOt/view>) and also SMQ StO II.8-02.04-2021 "Management of processes of scientific activity". For successful passing the practician by the University has signed contracts with leading universities and the companies .

The thesis within OP is individual for each doctoral candidate and unique in respect of scientific novelty and the practical importance (<https://drive.google.com/file/d/1P6h2dvCg5Kc4zS0it78fiRpYgNMO2mrW/view?usp=sharing>).

Compliance of tasks for independent work of doctoral candidates to the level of training and specifics of readable discipline is considered and discussed at faculty meetings. Logiko-

struktury the analysis of maintenance of OP (<https://docs.google.com/document/d/1MMzY2PgDrJ3z7jBmOu4zX8QqW3bBLTMR/edit?usp=sharing&oid=115134854348848244019&rtpof=true&sd=true>) is carried out according to the Strategic development plan for the university on the basis of which the development plan for OP (<https://docs.google.com/document/d/111FbiJW6z1gYfeFEoIVKiJ8NwUVGt9mf/edit?usp=sharing&oid=115134854348848244019&rtpof=true&sd=true>) in which the main target indicators are specified is formed. The MEP with the description of results of training: <https://drive.google.com/file/d/1wJPFeEAk3TktMSfGpdUe3m2F3tttcTA-/view>.

Content of disciplines of OP first of all is caused by the scientific directions of Metal forming department which for the last 20 years were created in school of sciences, which main idea receiving materials with an ultrafine grainnanodimensional structural grain structure by various methods of intensive plastic strain. This subject is relevant and corresponds to world level that is confirmed by existence of a number of publications of staff of department in high-rating scientific magazines in recent years. Also, in recent years, at department the new scientific direction connected with utilization of industrial wastes and production from them new materials of universal purpose develops ([https://drive.google.com/drive/folders/1zjUDRjdXNq\\_7-9F3o\\_JVNWaRACa-sTlh?usp=sharing](https://drive.google.com/drive/folders/1zjUDRjdXNq_7-9F3o_JVNWaRACa-sTlh?usp=sharing)).

OP in the sphere of nanomaterials and nanotechnologies functioning in 4 higher education institutions of RK: the KarIU (<https://drive.google.com/file/d/1wJPFeEAk3TktMSfGpdUe3m2F3tttcTA-/view?usp=sharing>), ENU of L.I. Gumilev (<https://ftf.enu.kz/storage/8D07140-Nanomaterials-and-Nanotechnologies-EP-21.pdf>), Al Farabi Kazakh National University (<https://www.kaznu.kz/ru/25123/page/>), KazNITU of K.I. Satpayev (<https://satbayev.university/ru/specialties/nanomaterialy-i-nanoinzheneriya>).

ENU of L.I. Gumilev OP has focus in the field of nuclear physics. The maintenance of OP in Al Farabi Kazakh National University and KazNITU of K.I. Satpayev corresponds to fundamental fundamentals of physics and chemistry. Thus, the accredited KarIU OP according to the contents can be considered as unique within RK as its contents includes applied orientation on a joint of materials science and metal working.

Questioning at EEC has shown that the overwhelming number TS is well informed and highly appreciates activity of higher education institution when developing OP. The following ultata which display full or partial satisfaction have been received:

- As far as the contents of the educational program are equitable to your scientific and professional interests and requirements? - 100%
- Evaluate support of higher education institution and its management in development of new educational programs - 100%
- Evaluate orientation of educational programs / training programs on forming at the studying skills to analyze a situation and to build forecasts – 100%, (it is very good - 35.3%).
- Evaluate how educational program for contents and quality of realization meets expectations of labor market and employers – 100%, (it is very good – 29.4%).

Poll has also defined high degree of satisfaction of the studying OP and knowledge of results of its development:

- Quality of training programs in OP - 100%;
- Informing requirements successfully to end this educational program (specialty) - 100%;
- Informing students on courses, educational programs and the received academic degree - 100%.

When developing OP, strategic documents are considered: Strategy "Kazakhstan-2050, State program "Digital Kazakhstan", State program of industrial and innovative development, expert opinions, proposals of students and employers.

***Analytical part***

On the basis of the submitted normative documents of a KarIU EEC notes that it in higher education institution is created and the documentary procedure of development, assessment and the statement of OP approved at the institutional level which provides observance of implementation of necessary requirements of the standard and achievement of the planned level of quality is applied.

OP regulate the purposes, results, contents, conditions and technologies of realization of educational process, assessment of quality of training of the graduate in the directions of preparation of "Nanotechnology engineering" and include the materials providing quality of training of students and realization of the appropriate educational technology. Realization of OP of appropriate levels of education is directed to forming of key competences of future specialists and satisfaction of requirements of labor market. OP provide a possibility of creation of an individual educational trajectory, accounting of personal requirements and opportunities of students. At the same time, it should be noted that the insufficient collaboration with the leading domestic and foreign laboratories, scientific centers, institutes which possess modern methods of receiving and a research of the studied materials and structures is traced.

On the basis of the analysis of maintenance of OP, KED and RUP it is established that the Structure of OP consists of modules which set is determined by set and content of competences of the graduates stated in models by levels of training and it is based on the European system of translation and accumulation of the credits (ECTS).

The modules of subject matters, their contents, as well as contents which are contained in the program the practician meets expectations and the stated competences. In the provided models of graduates of OP "8D07101-Nanotechnologies in engineering" results of training and personal qualities which graduates should receive on end of programs adequately are disclosed. The appropriated qualifications correspond to the eighth NSK level.

On the basis of the submitted documents it is possible to conclude that OP were exposed to external examination and also at their development offers TS, students and employers who have been involved in their development were considered.

The uniqueness of OP is provided with a set of elective disciplines caused by the stated requirements of representatives of employers and students .

***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- for positioning of OP "8D07101" of Nanotechnology in engineering in the educational market, (regional/national/international) and also demonstrations of its uniqueness to the management it is necessary (to cooperate expansion of borders of the research sphere with domestic and foreign laboratories, scientific centers, institutes which conduct related researches) a date of performance by June 30, 2023.

***EEC conclusions by criteria :***

According to the Development and Approval of the Educational Program standard the educational program 8D07101 – *Nanotechnologies in engineering* has 11 satisfactory positions and 1 assumes improvement.

#### 6.4. Continuous Monitoring and Periodic Assessment of Educational Programs standard

✓ *The higher education institution should provide revision of contents and structure of OP taking into account changes of labor market, requirements of employers and social inquiry of society.*

✓ *The higher education institution should show existence of the documentary procedure of carrying out monitoring and periodic assessment of OP for achievement of the goal of OP. Results of these procedures are directed to constant improvement of OP.*

*Monitoring and periodic assessment of OP should consider:*

✓ *contents of programs in the context of the last achievements of science and technologies for concrete discipline;*

✓ *changes of requirements of society and professional environment;*

✓ *loading, progress and release of students;*

✓ *efficiency of procedures of estimation of students;*

✓ *requirements and degree of satisfaction of students;*

✓ *compliance of the educational environment and activity of support services to OP purposes;*

✓ *All interested persons should be informed on any planned or taken actions concerning OP. All changes made to OP should be published.*

✓ *Support services should reveal needs of various groups, students and degree of their satisfaction with the organization of training, teaching, estimation, development of OP in general.*

#### **Evidential part**

The higher education institution provides revision of structure and the maintenance of OP taking into account changes of labor market, requirements of employers and social inquiry of society. Revision of the purposes of OP 8D07101 - "Nanotechnologies in engineering", as well as is carried out by any other OP in a KarIU at a stage of processing or updating by discussion at a faculty meeting. This procedure is based on SMQ P 4-25-1-2021 "The provision on development of modular educational programs". Frequency of revision of OP averages 1 time in 4 years. Unplanned revision happens in the analysis of changes of labor market, requirements of employers and social inquiries of society and detection of need of revision.

For the purpose of ensuring quality of graduates on the accredited OP at receipt the examination in a foreign language in exchange on obligatory existence of the certificate of IELTS, TOEFL with a certain minimum point has been cancelled. Also in higher education institution doctoral candidates all rubezhny reports are obliged to protect at faculty meetings and the enlarged meetings of Council of faculty (<https://drive.google.com/file/d/10UPT1icptkIzmRApInqIqKxVU22Z4mWS/view?usp=sharing>).

The university on a regular basis carries out processing and improvement of OP. So, for example, the MEP of 2019 (<https://drive.google.com/file/d/1-Pnj3s0HH0cUjI7E45Vg8oVJiTvXnuSJ/view?usp=sharing>) contained a list of competences, significantly different from the list of a sample of 2021 (<https://drive.google.com/file/d/1wJPFfeEAk3TktMSfGpdUe3m2F3tttcTA-/view?usp=sharing>), namely, the competence-based model of the graduate of OP has been processed.

The department chair a Metal forming is responsible for carrying out revision of OP. During revision the analysis of external changes is obligatory, in need of RUP and MEP necessary changes are made. All offers on modification are considered and discussed at a faculty meeting where all interested persons are invited (TS, doctoral candidates and representatives of employers). As the main tool of the analysis poll of doctoral candidates and employers is applied to identification of changes. On the matter also the opinion TS, namely lecturers and research supervisors – i.e. those representatives TS who are directly involved in the accredited OP is considered.

The higher education institution shows existence of the documentary procedure of carrying out monitoring and periodic assessment for achievement of the goal and constant improvement

of OP. Continuous monitoring and periodic assessment of OP at the university is carried out by three methods: by method of questioning and interviewing, by method of systematic and direct tracking results of training of doctoral candidates, by method of external expert estimates. For the purpose of assessment of efficiency of realization of OP the University considers opinion of employers and consumers of educational services (doctoral candidates) by conversations and exchange of views at joint faculty meetings a Metal forming, also representatives of employers give responses on the maintenance of OP. The analysis of results of training of doctoral candidates is carried out each semester by hearing of each doctoral candidate at scientific seminars of department and also delivery of semestrial reports in DSI and IR to the sector of postgraduate education and Erasmus +. "Nanotechnologies in engineering" passes expert assessment of OP 8D07101 after each revision of maintenance of OP. Passing monitoring the practician, tracking quality of their organization is carried out by heads the practician from department and research supervisors and also the sector of postgraduate education of Department of science and innovations of the university .

During monitoring and periodic assessment of OP are considered:

- the contents of the program in the context of the last achievements of science and technologies for educational and scientific discipline - contents of programs in the light of the last achievements of science are regularly updated by implementation of results of scientific research in educational process on concrete discipline for ensuring relevance. Also by drawing up and updating of the OP and syllabuses of disciplines the latest educational and scientific literature is used. So, for example, in discipline "Forming of properties of nanomaterials" technological features of receiving and properties of nanomaterials and also modern methods of a research of nanomaterials are considered;

- changes of requirements of society and professional environment;
- educational and scientific load, progress and release of students;
- efficiency of procedures of estimation of students;
- requirements and degree of satisfaction of students on the accredited OP;
- compliance of the educational environment and activity of support services to OP purposes.

OP 8D07101 - "Nanotechnologies in engineering" participates the second year in national IAAR rating, having taken the 1st place (<https://iaar.agency/rating/1/0/2021>) in 2021 that confirms quality of the rendered educational services.

The Metal forming department which is the accredited OP which is releasing on traces degree of satisfaction of employers with quality of training of specialists and introduces amendments in structure of OP in compliance with needs of employers. According to the employers who have employed graduates of OP it is possible to draw a conclusion on good degree of their readiness, adaptability to implementation of modern standards of training. It is the strength **accredited** by OP and allows to diversify the given elective courses.

Also, for identification of degree of satisfaction meetings of students with the management of department, dean's office, administration, directly with the rector are periodically held. Results of polls are used by the management for adoption of the subsequent solutions of development of the educational program according to activities.

Support services reveal needs of doctoral candidates of OP 8D07101 - "Nanotechnologies in engineering" **and degree** of their satisfaction with the organization of training, teaching, estimation, development of OP in general. Key need of all doctoral candidates is obtaining skills of writing and publication of scientific articles in rating magazines by results a SRWD. For this purpose the University will regularly organize the training master classes, often with involvement of representatives of publishing houses of magazines in Kazakhstan and the CIS countries and abroad. For example, **the seminar** has been held on February 15, 2022: "How to publish articles in magazines of Wiley according to requirements of the tender documentation of

grant financing a MES RK" with participation of the regional representative of the Wiley company in Kazakhstan and the CIS countries Ashimkhanova Ayman.

Monitoring of OP has shown high progress - 100% and degree of demand of graduates of the program in labor market, 100% of students on an educational grant are employed in 5 years that serves confirmations of high performance of estimation.

### ***Analytical part***

The analysis of plans, reports, the minutes of department, normative documents and materials of the website of a KarIU has allowed to conclude that at the university the documentary procedure of carrying out monitoring and periodic assessment of OP directed to improvement of the processes of implementation and the maintenance of OP is successfully used.

This mechanism allows to consider during the monitoring and revision of maintenance of OP changes in market of labor, the requirement of employers, TS and students. When carrying out monitoring the contents in programs of achievements of science and technologies, requirements of society and a circumambient, an academic load and release of students is evaluated. At the same time, it should be noted that the necessary accompanying documents for functioning of OP demand continuous updating.

The management of OP publishes data on changes of OP on the KarIU, in appropriate section (<https://ttu.edu.kz/education/modulnie-obrazovatelnie-programmi/>) there fore all interested persons can examine all changes of OP.

### ***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

### ***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- to support services of the purpose of OP to develop the procedure of maintenance of the educational environment the corresponding documentation (letters of consent to the guide of foreign consultants as the basis for the order on subjects of theses of PhD, updating the conclusion of new contracts and memorandums of cooperation with foreign and domestic Higher education institutions and laboratories, etc.) a date of performance by June 30, 2023.

### ***EEC conclusions by criteria :***

According to the Continuous Monitoring and Periodic Assessment of Educational Programs standard the educational program 8D07101 – *Nanotechnologies in engineering* has 9 satisfactory positions and 1 assumes improvement.

### **6.5. Studentocentrovanny Training, Teaching and Gain Score standard**

✓ *The management of OP should provide respect and attention for various groups of students and their requirements, granting flexible trajectories of training to them.*

✓ *The management of OP should provide teaching on the basis of modern achievements of world science and practice in the field of the direction of preparation, use of various modern techniques of teaching and assessment of the results of training providing achievement of the goals of OP, including competences, skills of performance of scientific work at the required level.*

✓ *The management of OP should define mechanisms of distribution of an academic load of students between the theory and practice within OP, ensuring development of contents and achievements of the goals of OP by each graduate.*

✓ *Important factor is existence of own researches in the field of a technique of teaching disciplines of OP.*

✓ *The higher education institution should provide compliance of assessment procedures of results of training in the planned results and the purposes of OP.*

✓ *The higher education institution should provide the sequence, transparency and objectivity of the mechanism of assessment of results of training of OP. Criteria and methods of assessment of results of training should be published in advance.*

✓ *The evaluating persons should own modern methods of assessment of results of training and regularly improve skills in this area.*

✓ *The management of OP should show existence of a system of return coupling on use of various techniques of teaching and assessment of results of training.*

✓ *The management of OP should show support of autonomy of students for the simultaneous management and the help from the teacher.*

✓ *The management of OP should show existence of the procedure of response to complaints of students.*

### ***Evidential part***

The university creates conditions for realization of the principles of studentcentrirovanny training, providing respect and attention for various groups of students and their requirements: granting flexible trajectories of training; use of various forms of teaching; regular return coupling; the pedagogical methods; support of autonomy of the student for the simultaneous appropriate management and the help from the teacher; strengthening of mutual respect of the teacher and student; existence of procedures of response to complaints of students.

Within the operating OP of the program of disciplines modules, as a rule, have the cross-disciplinary and multidisciplinary character providing training on a joint of a number of fields of knowledge. For definition of an individual trajectory of training under the leadership of an advisor and at consultation of the head of dissertation work the individual curriculum (IC) of the doctoral candidate is formed. At the same time the independent choice of teachers and disciplines from the catalog of elective disciplines (CED) is provided to them. Three elective disciplines are provided to doctoral candidates of OP for the choice: "Technologies of receiving volume nanostructural materials", "Equipment and devices for receiving nanostructural materials" and "Production top management". The last discipline is entered into the training program according to the recommendation of the representative of the industrial enterprise JSC ArselorMittal Temirtau as necessary for forming of skills of future top manager.

Students independently choose bases the practician with which the department has the contract or other bases, having signed the 3-sided contract with the enterprise and the university on the initiative.

Students have a possibility of the choice of a subject of dissertation works and heads (domestic and foreign).

The student is given an opportunity of the free choice of training at the Kazakh, Russian and English languages. Training in the accredited OP can be carried out if necessary by the principle a three languages. For this purpose there is the corresponding personnel potential. Training in the accredited OP can be carried out if necessary by the principle a three languages (kaz, rus, eng). For this purpose there is the corresponding personnel potential. G.E. Akhmetova and E.A. Panin have certificates of the translator (<https://drive.google.com/file/d/1iTMXEbK6kF26SfoxYuqmY57rO-KygO-s/view?usp=sharing>; [https://drive.google.com/file/d/1\\_MMI\\_W5zQ8WHB-u1O8ZyG4u42ROTQE-F/view?usp=sharing](https://drive.google.com/file/d/1_MMI_W5zQ8WHB-u1O8ZyG4u42ROTQE-F/view?usp=sharing)).

E.A. Panin has defended the dissertation at the University of chemical engineering and metallurgy (Sofia, Bulgaria) in English (<https://uctm.edu/bg/scientific-activity/procedures-for-the-acquisition-of-scientific-degrees/procedures-for-the-acquisitionofscientificdegrees/item/186%D0%B8%D0%BD%D0%B6%D0%B5%D0%B2%D0%B3%D0%B5%D0%BD%D0%B8%D0%B9%D0%B0%D0%BB%D0%B5%D0%BA%D1%81>



[%D0%B0%D0%BD%D0%B4%D1%80%D0%BE%D0%B2%D0%B8%D1%87%D0%BF%D0%B0%D0%BD%D0%B8%D0%BD\).](#)

When training the TS of department apply the following innovative methods of training, such as imitating modeling, design activity, with use of interactive technologies. So, for example, when studying discipline "Technology of receiving volume nanostructural materials" doctoral candidates by means of program complexes of final and element modeling create virtual models of various processes of intensive plastic strain and analyze the level of study of structure of material. Besides, the program Thermo-Calc complex is applied when studying discipline "Forming of properties of nanomaterials".

As a result of development of a program complex of final and element modeling of DEFORM the doctoral candidate M.Zh. Abishkenov has conducted researches and has published results on a thesis.

Development by doctoral candidates of educational programs happens according to the State obligatory standard of education approved by Order No. 604 of the Minister of Education and Science of RK of October 31, 2018. For receiving degree of the doctor of philosophy (PhD) on the accredited OP the student will have to master 45 credits of theoretical training, 25 credits of practice (10 credits – Student teaching and 15 credits – Research practice of the doctoral candidate), 123 credits of research work, including passing of a scientific training and 12 credits of a final assessment. For all OP components classroom work, contact work with the teacher and independent work is provided.

Average week load of the doctoral candidate does not exceed 57 hours. The doctoral candidate masters 30 academic credits in each educational semester.

Each class period of all types of study is followed by the corresponding number of independent work of the doctoral candidate (IWD and an IWDT). The volume of independent work from the total amount of all types of works during the entire period of training is not less than 70%.

The KarIU it is conducted various researches in the field of a technique of teaching subject matters of OP in which development own and adaptation of the available innovations, techniques and ways of training is carried out. At END department, initiative research work "Methodical and psychology and pedagogical aspects of improvement of teaching natural science disciplines of a credit system of training" was carried out. Results of this research are relevant and have a possibility of application in OP of various level. In a KarIU the Republican scientific and methodical conference where teachers share experience and results of own researches of scientific and methodical character is regularly held. In the collection of works RNMK "Education transformation: contents, technologies, quality" (<https://tttu.edu.kz/scintactivity/trudi-konferenciya>), taking place in a KarIU on November 29, 2019, are published a large number of reports, including more than 30 reports of teachers of Metal forming, MIME departments, TMiT and HTiE which teachers are the acting and potentially possible heads of doctoral candidates of the accredited OP.

All TS of department hold a number of patents for inventions and useful models on a profile of the directions of the scientific research. Also E.A. Panin has the certificate on passing of advanced training courses on modern technologies of professional pedagogical education (<https://drive.google.com/file/d/1wSPZlnu9szS-dSN72RUedEBv5x5QVZ75/view?usp=sharing>). OP TS actively are engaged in scientific activity that is implemented in the form of writing of monographs. For example, [https://drive.google.com/file/d/1U9oQPo8thGT\\_0t079Wr25Y-qrQInmsP3/view?usp=sharing](https://drive.google.com/file/d/1U9oQPo8thGT_0t079Wr25Y-qrQInmsP3/view?usp=sharing). S.S. Aynabekova has the Certificate on entering of data into the state register of the rights for the objects protected by copyright of PK (<https://drive.google.com/file/d/1bhHZ5Svfs-xn6-gsAOIRkiLnq1aq6HAg/view?usp=sharing>).

The KarIU provides compliance of assessment procedures of results of training of the studying OP in the planned results of training and the purposes of the program. Criteria and

methods of assessment within OP in open access are published on the website of a KarIU (<https://ttu.edu.kz/education/sistema-ocenki-znaniy-studentovstudent-assessment-systemstudentterdi%D2%A3-bilimin-ba%D2%93alau-zh%D2%AFyesi/>) and in the section "Policy of Exposure of Estimates" of syllabuses of disciplines. The new methodical instructions "System of Estimation of Results of Training" are also developed and approved in November, 2021.

the university, mechanisms of ensuring development by each graduate of OP of results of training are defined and the completeness of their forming is provided. Mechanisms of ensuring development by each graduate of op of results of training are described in internal document SMQ StO II.8-02.02-2021 "Management of process of educational activity". Development of results of training by each graduate is carried out during study which includes lectures, seminars, a practical training, laboratory works, consultations, independent work of the student, independent work of the student under the leadership of the teacher, research work of the doctoral candidate, pedagogical and research practitioners .

Compliance of level of knowledge of students to the planned results of training and the purposes of the program is controlled by application of a mark and rating system of estimation of knowledge with a wide range (from 0 to 100 points) during the current, rubezhny and final control (intermediate certification). The current control is exercised in the form of an examination, skills of students by means of various forms of control: oral poll, examinations, individual homeworks, discussions, trainings etc. At the general assessment of knowledge of students on the current control 60% are taken away therefore the teacher accurately registers all forms of the current control in a syllabus (attendance, individual tasks, tests for self-examination, etc.) and define a share of each look in the general assessment of knowledge. For quantitative assessment of knowledge of doctoral candidates the rubezhny control in the form of 2 ratings – PK1 and PK2 is provided in the academic period. Rubezhny control allows to carry out continuous monitoring of educational achievements of the student during all academic period and serves as admission to final control (intermediate certification).

The criteria and methods of estimation of knowledge of doctoral candidates providing an order of carrying out the current, intermediate and final control of knowledge the operating technique of a gain score of doctoral candidates for exposure of rating estimates on disciplines are provided to SMQ P 4-34-2020 "The organization of the current and rubezhny control, intermediate certification and assessment of knowledge of students" ([https://drive.google.com/file/d/1c9JaWkaOs8HSLFkby\\_303EZ1q5AY7TP1/view?usp=sharing](https://drive.google.com/file/d/1c9JaWkaOs8HSLFkby_303EZ1q5AY7TP1/view?usp=sharing)).

Also on the website of the university "The system of assessment of knowledge of students" available to a wide range of users according to the reference <https://ttu.edu.kz/education/sistema-ocenki-znaniy-studentovstudent-assessment-systemstudentterdi%D2%A3-bilimin-ba%D2%93alau-zh%D2%AFyesi/> is posted in the section "Education" in open access.

Teachers of the university fully own modern methods of assessment of results of training and periodically improve skills in this area.

More than 90% of examinations are held to a KarIU in the form of electronic testing with use an AIS of "Platonus". At the same time the tests of various type (associative, with the multiple choice, on establishment of the sequence, etc.) with split-level tasks allowing to evaluate most objectively knowledge and abilities received by students in the course of theoretical training are used. Results of electronic testing are automatically clearly demonstrated to the student at manual completion of testing or the termination of a limit of time for conducting testing that provides transparency of assessment procedure of knowledge.

For developing the skills of the evaluating persons by the university seminars on holding examinations in an AIS of "Platonus", on drawing up and updating of test tasks, etc. are held, in 2020 the seminar training on the subject "Effective Methods and Methods of Distance Learning" has been held to a KarIU. (<https://ttu.edu.kz/2020/11/seminar-trening-na-temu-effektivnye->

metody-i-priemy-distancionnogo-obucheniya%d2%9basy%d2%9bty%d2%9btan-o%d2%9byudy%d2%a3-tiimdi-%d3%99disteri-men-%d3%99disteri-ta%d2%9byrybynda%d2%93y-seminar-tre/).

Much attention is paid to questions of mutual respect, prevention of corruption actions and the academic honesty between students and teachers, (<https://tttu.edu.kz/abuniv/qms/polozheniyaprovisions-erezheler/> and <https://tttu.edu.kz/2021/03/kariu-prinyal-aktivnoe-uchastie-v-ocherednoy-serii-lekcionnix-zanyatiy-antikorrupcionnoy-shkoli-sanaly-urpaq-2021kariu-sanaly-urpaq-2021-sibaylas-zhem%d2%9borli%d2%9b%d2%9ba-%d2%9barisi-mektebini/>). The Provision "About Ensuring the Academic Honesty in NLC "Karaganda Industrial University" <https://drive.google.com/file/d/1ZjRH-zMHjTa9xFiwxDJ9egG6vqzahCqN/view?usp=sharing/> and "The code of ethics and the academic honesty of students" of [https://drive.google.com/file/d/1pMuCpp2uEsl8dSXDFx1B2rX1ydV\\_6YrI/view](https://drive.google.com/file/d/1pMuCpp2uEsl8dSXDFx1B2rX1ydV_6YrI/view) regulates the principles of relationship of staff of the university.

Forms of return coupling for definition of degree of satisfaction of students with methods of training and assessment of knowledge are: holding poll in the form of questioning, the boxes of complaints and offers placed each academic building, dean's office, department.

The questioning which is carried out to EEC visit time has shown that the students taking part in it are completely satisfied :

- Academic load of 100%,
- Requirements TS to the student for 100%,
- Quality of examination materials (tests and examination questions, etc.) for 100%,
- Objectivity and justice of teachers for 100%,
- Equal opportunities for development of OP and personal development are provided to all studying for 100%.

### ***Analytical part***

As show results of poll of doctoral candidates during EEC visit the vast majority of them is satisfied with the mechanism of maintenance of studentocentrirovanny training in higher education institution and the practitioners existing for this purpose in the field of the choice, quality of training and evaluation materials and techniques, the relation about TS and the management that confirms creation of generally equal opportunities for various groups of students.

On the basis of studying normative documents, an interview with teachers and doctoral candidates, visits of classes can be concluded that at the university at realization of OP 8D07101 – Nanotechnologies in engineering are used the modern educational technologies which are well mastered by all teachers, innovative technologies with use of interactive methods and means, the modern laboratory equipment and computer programs. TS and services of the university apply objective criteria and methods of assessment of results of training .

Contents and structure of RUP and IEP allows to conclude that the load dispatching mechanism accepted in higher education institution in the provided OP has provided observance of a standard ratio between the theory and practice and is directed to achievement of the goals of OP by all graduates.

Contents of curricula and reports TS, plans and reports of department, the number of the published textbooks and manuals show that at realization of OP author's developments and courses take root into educational process. At the same time, it should be noted that there are not enough works on carrying out own researches in the field of a technique of teaching elective disciplines for this OP.

Confirmation of level of competence of teachers the efficiency and the quality of teaching evaluated by carrying out open studies, mutual visits of classes and also as carrying out questioning "The teacher the student's eyes" regarding quality and efficiency of the organization

of educational process, level detection of professional norms and ethics, competence, oratorical and communicative abilities of teachers acts. Results of these actions form a basis for extension of employment contracts TS, promotions.

Professional potential of the teacher is evaluated also according to scientific and scientific and methodical publications, publications in media, to public recognition and creative activity.

The assessment procedures of results of training described above answer the purpose and results of training in OP. It is confirmed by responses of employers, as at high school questioning. And by results of poll during EEC visit.

The documentary mechanism of assessment of results of training shows that in higher education institution the transparency and objectivity is provided, evaluation criteria are in advance known to participants of process in which the prepared evaluating persons are involved. At the same time, it should be noted that are not fulfilled and the modern methods of assessment of results of training considering specifics of OP are not applied.

Forms of return coupling for definition of degree of satisfaction of students with methods of training and assessment of knowledge have satisfied vast majority of students.

***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- ensure functioning on carrying out own researches in the field of a technique of teaching subject matters for this OP during all period of validity of accreditation;
- fulfill and apply modern methods of assessment of results of training and to regularly improve skills in this area during all period of validity of accreditation.

***EEC conclusions by criteria :***

According to the Studentocentrirovanny Training, Teaching and Gain Score standard the educational program 8D07101 – *Nanotechnologies in engineering* has 10 satisfactory positions.

**6.6. Students standard**

✓ *The higher education institution should show policy of forming of the contingent of students and provide transparency of its procedures. The procedures regulating life cycle of students (from receipt before end), should be defined, approved, published.*

✓ *The management of OP should provide carrying out special programs of adaptation and support for just arrived and foreign students.*

✓ *The higher education institution should show compliance of the effects of the Lisbon convention on recognition, including existence and use of the mechanism by recognition of results of the academic mobility of students and also results of additional, formal and informal training.*

✓ *The higher education institution should provide an opportunity for external and internal academic mobility of students and also render them assistance in receiving external grants for training.*

✓ *The higher education institution should stimulate actively students to self-education and development out of a main routine (extracurricular activities).*

✓ *Important factor is existence of the mechanism of support of gifted students.*

✓ *The higher education institution should show cooperation with other organizations of education and the national centers "To the European network of national information centers by the academic recognition and mobility / National academic Information Centres of Recognition" ENIC/NARIC for the purpose of ensuring comparable recognition of qualifications.*

✓ *The higher education institution should provide students with places of practice, show the procedure of assistance to employment of graduates, maintenance of communication with them.*

- ✓ *The higher education institution should show the procedure of delivery to graduates of the documents confirming the received qualification including the achieved results of training.*
- ✓ *The management of OP should show that graduates of the program have the skills demanded in labor market and that these skills are really demanded in labor market.*
- ✓ *The management of OP should show existence of the mechanism of monitoring of employment and professional activity of graduates.*
- ✓ *Important factor is existence acting associations/associations of graduates.*

### ***Evidential part***

The KarIU has policy of forming of the contingent of students from receipt before release and provides transparency of its procedures. The procedures regulating life cycle of students (from receipt before end), are defined, approved, published in internal documents the Provision on selection committee of NLC "Karaganda Industrial University", SMQ StO II.8-02.02-2021 "Management of process of educational activity", the Academic policy of a KarIU, etc.

Informing potential entrants on requirements of OP and specifics of its realization is provided by means of carrying out professional orientation work. At the university the teachers of department systemically carry out the professional orientation work among undergraduates of the region directed to preparation and selection of candidates for receipt for doctoral studies.

Forming of the contingent of students is carried out by Selection committee (Front office) which acts according to SMQ PP 15-58-17.11-2020 the Provision on selection committee of NLC "Karaganda Industrial University". This Situation defines the status of selection committee, its organizational structure, functional duties, a circle of powers (rights) and level of responsibility.

Forming of the contingent of students is carried out by means of placement of the state educational order for training of specialists with postgraduate education and also payments of training at the expense of own means of citizens and other sources of financing. In a KarIU the persons having the general postgraduate education (academic degree of the master), the existing certificate on knowledge of a foreign language and meeting other requirements are accepted. the established Standard Regulations of Admission to training in the organization of education implementing the educational programs of the higher and postgraduate education approved by the Order of the Minister of Education and Science of RK of October 31, 2018 No. 600.

Transfer on training in doctoral studies is made according to Regulations of Admission to training in a KarIU.

On the website of the university (<https://ttu.edu.kz/priem-v-doktoranturu/>) there is all necessary information for coming to doctoral studies. On the page there is an OP list of doctoral studies, in the section of the Regulation of Admission there is information on terms of documents and their list is provided, information on quantity of grants on OP is given.

higher education institution for doctoral studies the translated (threshold) GPA level of 2.33 points when translating from 1 course on 2 is established and from the 2nd course on 3.

The translation of students from specialty on specialty, from one educational institution in another, from a course on a course, reoffset of the credits mastered in other higher education institution, an order of assignment, granting the academic holidays is, etc. carried out on the basis of the academic policy of a KarIU (<https://ttu.edu.kz/education/akademicheskaya-politika/>) and the existing regulations (R) of RK.

The management of the university and the accredited OP is carried out by programs of adaptation and support for just arrived and foreign students.

The university provides the arrived doctoral candidates with the reference book guide ([https://drive.google.com/file/d/1fIWdv2vGYZlij1mOB\\_giiegwfaFkY5y/view](https://drive.google.com/file/d/1fIWdv2vGYZlij1mOB_giiegwfaFkY5y/view)) in which are reflected: Regulations, basic concepts, the brief historical information and structure of the university, location of all services and the phonebook, the code of honor of the student, their right and duty, general provisions on credit technology of training, a method of calculation of

assessment of knowledge of the student and calculation GPA, an order of carrying out the appeal and a summer educational semester, the instruction for use of library of the university. Also the lesson schedule and the academic calendar it is posted on the website of the university in the section "Student" (<https://ttu.edu.kz/student/>).

Each teacher conducting classes in OP of doctoral studies provides the doctoral candidate an EMCD, a syllabus, educational and methodical maintenance, acquaints with the schedule of performance of independent works, course policy, criteria for evaluation and types of control of knowledge.

Regular control of development by doctoral candidates of OP is exercised by the head of the department and the dean of faculty.

The KarIU shows compliance of the effects of the Lisbon convention on recognition, including existence and use of the mechanism by recognition of results of the academic mobility of students and also results of additional, formal and informal training.

The KarIU there is a practice of recognition of the periods of training and qualifications of the previous training, including recognition of informal and informal training which are based on ensuring actions according to the Lisbon Convention on recognition of the qualifications relating to the higher education in the European region.

According to the Academic policy of a KarIU, the doctoral candidate has the right for reoffset of the disciplines which are earlier mastered by it in other educational institutions.

Students from foreign higher education institutions can be translated or be restored in a KarIU, at the same time they provide the relevant supporting documents.

Reoffset of the mastered credits is carried out on the basis of comparison of OP, the contents and the list of the mastered disciplines, their volumes, the acquired knowledge, abilities, skills and competences and also results of training.

Within the Bologna Process in a KarIU the great value is given to external scientific training for expansion of SRWD base and the academic mobility of doctoral candidates, TS and administrative personnel of the university. The mechanism of recognition of the results of training mastered during the academic mobility is registered in SMQ P 4-24-2021 "The provision on the academic mobility".

The university develops both external (international), and internal (national) academic mobility, memorandums of cooperation with the leading higher education institutions of Kazakhstan, the FSU and beyond consist. So, for example, there are agreements in force with such higher education institutions as the Technical university Ostrava (Czech Republic), the Freiberg mountain academy (Germany), the Lublin technical university (Poland), the Kremenchuk national university of M. Ostrogradsky (Ukraine), etc. (<https://ttu.edu.kz/parcontracts/>).

The KarIU provides an opportunity for external and internal mobility of doctoral candidates of OP, renders them assistance in receiving external grants for training. All doctoral candidates of the accredited OP passed scientific training. Doctoral candidate gr. NiN-18 G. Dairbekova has visited from October 24 to October 27, 2019 the Tajikistan national university of the city of Dushanbe (Tajikistan). During the sanitary restrictions caused by COVID-19 pandemic, other training took place in Kazakhstan. All results mastered during training are read in full. Students and TS can find information on programs of external and internal mobility on the website of a KarIU (<https://ttu.edu.kz/scintactivity/mezhdunarodnoe-sotrudnichestvo-i-akademicheskaya-mobilnost-international-cooperation-and-academic-mobility/>), consult with the [curator](#), at department, in dean's office. Coordination of programs of the academic mobility at the university is carried out by a DAP and DS&IS of MS.

All key moments of the academic mobility and scientific training are reflected in the Academic policy of a KarIU, item 12 :

([https://drive.google.com/file/d/1HhwWoTzpih7Qo\\_59VJvwVgUhOVpnt5-h/view?usp=sharing](https://drive.google.com/file/d/1HhwWoTzpih7Qo_59VJvwVgUhOVpnt5-h/view?usp=sharing)) and in the Provision on the academic mobility of NLC "KarIU".

The internal academic mobility was carried out in the form of scientific training in higher education institutions of Kazakhstan. Orders on the direction on training are available according to references: <https://drive.google.com/file/d/19Dy02jnhviSj7Ok8kRWy0jHdMPoup8/view?usp=sharing>; [https://drive.google.com/file/d/1iHveEJvJKmvzkvzZ0gigUF41W\\_uK5S5/view?usp=sharing](https://drive.google.com/file/d/1iHveEJvJKmvzkvzZ0gigUF41W_uK5S5/view?usp=sharing); <https://drive.google.com/file/d/1HqaUTTxIxSeWhyB8fX0N72MVLtQiBaJ/view?usp=sharing>.

Specialists a DAP and DNIIMS, advisor at department help doctoral candidates with the choice of an educational trajectory for participation in programs of mobility. Also it is assisted in execution of necessary documents and visas, leaving on training in foreign higher education institution .

Within the educational program 8D07101 – Nanotechnologies in engineering of a training there have passed M.Zh. Abishkenov in the Chenstokhovsky polytechnical university (Mr. Chenstokhov, Poland), in Karaganda technical the university (Karaganda), G.S. Dairbekova at the Karaganda university of E.A. Buketov (Karaganda), in KazNITU of K.I. Satpayev (Almaty), D.B. Bekmagambetov and K.S. Tolubayev at the Karaganda university of E.A. Buketov (Karaganda), D.B. Tolubayeva in KazNITU of K.I. Satpayev (Almaty) (<https://drive.google.com/drive/u/2/folders/15WTxB-okHJV8J178W8CX7gExlwQhY-Q6>).

For development and satisfaction of creative and intellectual needs of students for a KarIU various creative associations and collectives work: Kazakh and Russian leagues of debatny club; Student's newspaper "MIU studentter\_n\_habarshysy" (<https://drive.google.com/open?id=1AmB3sFd3pAXmpLUeaicQAoqqL4TsuPPY>); Abadan debating club; Kazakh and Russian leagues KVN; studio of vocalists; studio of leaders-comperes; volunteer club "am or"; poetic club Parasat.

Doctoral candidates of the accredited OP actively participate public life of the university. In KARIU such events as the creative competition "Two Stars", a gala concert by the International March 8, the holiday Nauryz, the interfaculty competition "Ms. KARIU", "Mr. KARIU", actions for the Victory Day in the Great Patriotic War, dedication in students and others are held.

The KarIU as the member of Bologna Process, cooperates with the organizations of education and the national centers "The European network of national information centers by the academic recognition and mobility / National academic Information Centres of Recognition" ENIC/NARIC for the purpose of ensuring comparable recognition of qualifications, i.e. with the Center of Bologna Process of RK.

For the purpose of ensuring comparable recognition of qualifications DNIIMS with a KarIU is engaged in integration of the university into world educational and scientific systems and establishes cooperation with other higher education institutions and the national centers ENIC/NARIC for simplification of recognition of the qualifications received within the system of the academic degrees on the basis of two-step structure of degrees / qualifications which is entered in the countries participating in Bologna Process by means of reduction of the terms, efforts and expenses demanded for recognition of qualifications in the European space. For example, the associate professor a Metal forming E.A. Panin has defended the dissertation on award of degree of PhD at the Chemical and technological and metallurgical university the Sofia (Bulgaria) which then has undergone nostrification is recognized in RK.

Work on the organization of all types the practician and to assistance to employment at department is based on a continuous communication with potential employers, the conclusions of new contracts on cooperation. The list of the signed contracts and memorandums with the city-forming enterprises, representatives of large and medium business, is given by the leading and national higher education institutions and scientific research institute of Kazakhstan and the abroad in the website of a KarIU (<https://ttu.edu.kz/praktikapracticepraktika/polozhenie-o-praktike/>).

Scientific research and pedogagisky the practician carries out coordination and the

general guide to the organization and carrying out department and DNIIMS. Programs of practice are developed by Metal forming department and are in the OP educational and methodical complex.

The procedure and order of the organization and carrying out scientific research and pedagogical the practician in a KarIU is regulated by SMQ P 4-28-2021an order of the organization and carrying out professional the practician and definitions of the organizations as bases of practice.

Employment of three graduates of 2021 of the accredited OP at the moment makes 100%. Employment in 2022 also of 100% is planned.

The KarIU the association of graduates which has the page on the website of the university, acquaintance with which has revealed low informational content and low renewability of the placed materials, is created.

### ***Analytical part***

On the basis of the analysis of normative documents of higher education institution EEC notes that they policy and the mechanism of forming of the contingent of students are documented and directed to its preservation and growth, support of students at all grade levels from receipt before its end. All materials are published and available to participants of process that provides transparency throughout all educational cycle.

the university develops both external (international), and internal (national) academic mobility, memorandums of cooperation with the leading higher education institutions of Kazakhstan, the FSU and beyond consist.

the university there are mechanisms of continued support of talented and active youth. For employment of youth and its employment annual fairs of graduates with the invitation of potential employers are held.

The materials and achievements provided by higher education institution, allow to imprison students that in higher education institution there are conditions for receiving self-education and development out of the training program and the mechanism of stimulation. In a KarIU the mechanism of monitoring of employment and professional activity of graduates functions. The university the management of OP provides students with places of practice and promotes employment of graduates.

Experts note that the higher education institution provides graduates with the documents confirming the received qualification taking into account the achieved results of training, the status and content of the got education.

higher education institution there is an Association of graduates, however, as have shown results of an interview and materials of association on the website of the university its activity is insufficiently effective.

### ***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

### ***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- inform and to work systemically on development of activity of Association of graduates. The graduates working in various spheres can introduce amendments and innovations in image, educational and other activity of higher education institution (scholarships to successful students, the practice-focused training, the advanced information and communication technologies, etc. a date of performance by 01:01. 2023.

### ***EEC conclusions by criteria :***



According to the Students standard the educational program 8D07101 – *Nanotechnologies in engineering* has 12 satisfactory positions.

### 6.7. Faculty standard

- ✓ *The higher education institution should have the objective and transparent personnel policy in OP coal mine including hiring (including invited TS), the professional growth and development of personnel, the providing professional competence of all state.*
- ✓ *The higher education institution should show compliance of qualitative structure TS to the established qualification requirements, the strategy of higher education institution, OP purposes.*
- ✓ *The management of OP should show change of a role of the teacher in connection with transition to studentcentrirovanny training and teaching.*
- ✓ *Higher education institution the TS, including young teachers should give opportunities of career development and professional development.*
- ✓ *The higher education institution should involve in teaching specialists of the relevant industries possessing the professional kompetenmost conforming to requirements of OP.*
- ✓ *The higher education institution should show existence of the mechanism of motivation of professional and personal development TS.*
- ✓ *The higher education institution should show broad application TS of information and communication technologies and software in educational process (for example, on-line of training, an e-portfolio, MOOCs, etc.).*
- ✓ *The higher education institution should show orientation of activity on development of the academic mobility, involvement of the best foreign and domestic teachers.*
- ✓ *The higher education institution should show the involvement of each teacher into advance of culture of quality and the academic honesty in higher education institution, define a contribution TS, including invited, in achievement of the goals of OP.*
- ✓ *Important factor is the involvement TS in development of economy, formation, science and the culture of the region and country.*

### **Evidential part**

The KarIU has the objective and transparent personnel policy, including on the OP 8D07101 "Nanotechnologies in engineering" including hiring, professional growth and development of personnel, providing professional competence of all staff of department.

The personnel TS, OP 8D07101 "Nanotechnologies in engineering" providing realization is created from the highly skilled and competent teachers having wide experience of scientific and pedagogical and research activity which is connected with the professional standard and NSK. It summaries confirm TS (<https://drive.google.com/drive/folders/0ANjTcW-wdfB3Uk9PVA>).

The personnel of department is completed according to the legislation of PK and CMK P 4-19-2020 of "The rule of competitive replacement of positions of scientific and pedagogical personnel of the university". In a KarIU it is created and actively the tender committee works. The announcement of competitive replacement of vacancies is published on Internet resources, not less than for 10 calendar days before date of completion of documents acceptance and on the website of the [https://tttu.edu.kz/vakansii\\_kgiu/](https://tttu.edu.kz/vakansii_kgiu/) university.

Criteria at employment TS are established on the basis of SMQ P 4-20-2022 "The provision qualification

Requirement of OP 8D07101 "Nanotechnologies in engineering" in TS is defined proceeding from the proof academic load calculated on the basis of the approved working curricula (WC) of specialties, and requirements to an order of planning of an academic load of the faculty.

The qualitative structure TS corresponds to a profile of the accredited OP. The TS participating in realization of OP 8D07101 "Nanotechnologies in engineering" for the last 5 years are provided in table 1 from which follows that academic degrees have all TS and

ostepenennost make 100 %.

Table 1 – The TS participating in realization of OP 8D07101 "Nanotechnologies in engineering" (6D074000 "NiN") for the last 5 years in NLC "KarIU"

№	FULL NAME.	Basic education, specialty, year of the termination	Code of specialty of an academic degree and academic status	Note
1	Zhasulan Amanzholovich Ashkeev	1993 - The plant technical college at KarMK (nowadays Karaganda industrial university), specialty "Metal Forming", the metallurgical engineer	1999 - the c.t.s. in a 05.03.05 – "Machines and processing by pressure	Head of the doctoral candidate M. Abishkenov gr NiN-18
2	Gulzhaynat Esenzholovna Akhmetova	2008 - Karaganda State Industrial University, specialty 240240 "Metallurgical science and heat treatment of metals", engineer. 2010 - Karaganda State Industrial University, specialty 6N07100 "Materials science and technology of new materials", master	2018 – PhD in the specialty 6D071000 - Materials science and technology of new materials	Head of the doctoral candidate K. Tuyskhan gr NvI-20
3	Andrey Valeryevich Volokitin	2006 - Karaganda metallurgical institute (nowadays Karaganda industrial university (KSIU)), specialty "Metal Forming". 2012 specialty 6M071000 "Materials science and technologies of new materials", master.	2019 - PhD in the specialty 6D071000 "Materials science and technologies of new materials "	Head of the doctoral candidate A. Fedorova gr. NvI-21
4	Evgeny Aleksandrovi ch Panin	2006 – Karaganda metallurgical institute (nowadays Karaganda industrial university), specialty "Metal Forming" 2015 – a magistracy at a KSIU , specialty 6M071200 "Mechanical engineering"	2017 – PhD in a 02.01.17 – "Technologies, machines and systems for processing by plastic strain", Bulgaria 2018 – nostrification of PhD in "Metallurgy" 2021 - the associated professor of metallurgy	Talent pool
5	Saule Kazzhanovna Kabiyeva	1987 - Karaganda state university of E.A. Buketov 02.00.03 "Organic chemistry"	1998 - to. x. N in a 02.00.03 "Organic chemistry"	Head of the doctoral candidate gr. NvI-20 D.B. Tolubayeva.
6	Krivtsova Olga Nikolaevna	1997 - Karaganda metallurgical institute (nowadays Karaganda industrial university), specialty "Metallurgical Machines and Equipment", mechanical engineer	2004 - the c.t.s. in a 05.03.05 - "Technologies and machines of pressure treatment"	Theoretical training of doctoral candidates of OP The KarIU since 2019 does not work in NLC.
7	Irina Evgenyevna Volokitina	2006 - Karaganda metallurgical institute (nowadays Karaganda industrial university),	2017 of PhD in the specialty 6D071000 "Materials science and	Theoretical training of doctoral

№	FULL NAME.	Basic education, specialty, year of the termination	Code of specialty of an academic degree and academic status	Note
		specialty "Metallurgical Science and Heat Treatment of Metals", engineer 2011 - specialty 6M071000 "Materials science and technologies of new materials", the master.	technologies of new materials "	candidates of OP The KarIU since 2020 does not work in NLC.
8	Zhautikov Bakhyt Akhatovich	1985 - Karaganda awards of the Labour Red banner polytechnical institute (nowadays Karaganda technical university), specialty "Electrification and Automation of Mining Operations", mining electrical engineer.	2008 - D.t.s. in a 30.05.08 power 2009 – professor as "power engineering specialist"	Head of doctoral candidates of river of NiN-18 of Dairbekova N. G.I Bekmagambetova . The KarIU since 2021 does not work in NLC.

The head of the department distributes pedagogical loading according to a post TS. Teachers should have basic higher education on the OP profile, the corresponding academic degree, certificates passing of advanced training courses and passing of training on a profile of the taught disciplines, scientific and scientific and methodical works on the OP profile ([https://drive.google.com/drive/folders/1zjUDRJdXNq\\_7-9F3o\\_JVNWaRACa-sTIh?usp=sharing](https://drive.google.com/drive/folders/1zjUDRJdXNq_7-9F3o_JVNWaRACa-sTIh?usp=sharing)), also for the management of doctoral candidates TS should have an academic degree and the corresponding Hirsha index, quoting, the number of articles in rating magazines ([https://drive.google.com/drive/folders/1j9QNovsZlqgedOanR-SknyBAIRf7SwI\\_?usp=sharing](https://drive.google.com/drive/folders/1j9QNovsZlqgedOanR-SknyBAIRf7SwI_?usp=sharing)).

The majority of classes are held with use of problem training, the design technologies (Deform 3D, Simufact, virtual imitating Sike exercise machines) assuming modeling of processes of intensive plastic strains, receiving UMZ and nanostructure, also at theoretical training the laboratory of the engineering profile "Electronic Microscopy and Nanotechnologies" is used.

Results of scientific research TS of the accredited OP find reflection in the scientific articles published in the Kazakhstan and international magazines including with a nonzero impact-factor, performances at scientific conferences of various level (<https://drive.google.com/drive/folders/0ANjTcW-wdfB3Uk9PVA>).

Needs of workers are defined by means of questioning (<https://www.surveio.com/survey/w/F5N3Y3H9K4Z9C3N3Y>). Satisfaction degree TS is defined by means of holding sociological poll (questioning on the KarIU website - <https://ttu.edu.kz/anketi-oprosniki/>) not less than 1 time a year.

Teachers of Metal forming department according to the plan of department take training and advanced training courses TS ([https://drive.google.com/drive/folders/1zjUDRJdXNq\\_7-9F3o\\_JVNWaRACa-sTIh?usp=sharing](https://drive.google.com/drive/folders/1zjUDRJdXNq_7-9F3o_JVNWaRACa-sTIh?usp=sharing)). Monitoring and assessment of efficiency of the passable training and advanced training courses is carried out by hearing of results at a faculty meeting ([https://drive.google.com/file/d/1WVHsh8eZldYC636\\_CX8s2XnwHtHT50Nc/view?usp=sharing](https://drive.google.com/file/d/1WVHsh8eZldYC636_CX8s2XnwHtHT50Nc/view?usp=sharing)).

Stimulation of professional and personal development TS of department is carried out by the system of financial motivation which is available in higher education institution which includes: one-time awarding (rewarding) the caused a stir workers (the moral factors

characterizing conscientious attitude of the worker to work, his initiative, creative approach to business, etc.); the awarding dated for national, public and professional holidays; the reward regulated by rating which provides the differentiated approach to charge of an award.

Except intra-university methods of encouragement and motivation the TS, contribute to the personal development also recognition of merits TS at the state and international level. So, the associate professor a Metal forming, PhD E.A. Panin the owner of a rank "The Best Teacher of Higher Education Institution — 2018", in 2021 the rank of the associated professor of metallurgy, the repeated owner state scientific grants for talented young scientists is given. Acting associate professor Metal forming, PhD A.V. Volokitin owner of a rank "The Best Teacher of Higher Education Institution — 2021". The associate professor a Metal forming, G.E. Akhmetov's PhD in 2018 is awarded the diploma and the gold medal for the best report on a thesis at the IX Eurasian academic and research conference "Durability of Non-uniform Structures" PROST 2018 NITU MISIS (Russia, Moscow). The associate professor a Metal forming, the c.t.s. Zh.A. Ashkeev the owner of a rank "The Best Teacher of Higher Education Institution — 2021", is awarded the anniversary medal devoted to the 100 anniversary since the birth of the Academician of AN KAZSSR, Doctors of Engineering, professor A.S. Saginov, by the breastplate "For merits before a KarIU".

According to the decision of the Academic Council of expense TS at execution of requests for an invention, on obtaining the ISBN number the university completely refunds financial expenses and also expenses on publication of article in the high-rating magazine for doctoral candidates.

The KarIU it is developed and the provision on an educational grant of the university, a grant of the university and privileges for training in NLC is widely applied by "KarIU" in SMK P 3-01-2021 ". The discount for training of children and members of families of staff of higher education institution is provided in this Situation.

The TS belong to non-financial motivation the system of recognitions and awards connected with results of work and social activity of workers. The system of awards includes corporate awards and distinctions of higher education institution and also the state and departmental awards.

The university completely provides employees and studying at the university territory an opportunity to use library resources of the knowledge-intensive bases, such as Scopus (<https://www.scopus.com>), WOS ([https://apps.webofknowledge.com/WOS\\_GeneralSearch\\_input.do?product=WOS&search\\_mode=GeneralSearch&SID=D6CnONyurfMUDEfoIYG&preferencesSaved=](https://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&search_mode=GeneralSearch&SID=D6CnONyurfMUDEfoIYG&preferencesSaved=)).

The organization and realization of the international academic activity TS is directed to improvement of quality of educational preparation TS and introduction of a certain contribution to positive image and the rating of the university in Kazakhstan and abroad. The academic mobility TS is generally provided by means of the exchange Erasmus+ KA1 programs and memorandums with higher education institutions of Kazakhstan. In 2018 E.A. Panin passed a training according to the ERASMUS+ program in Universitat Politecnica de Catalunya (Spain).

Involvement of the leading domestic and foreign scientists for lecturing and holding master classes where any student in a KarIU can be the listener practices in a KarIU. For example, during 2018-2022 at the university gave lectures professor Marek Miloš from the Lublin technological university (Lublin, Poland) and professor of the research center of investigation and strategic researches of the Link Campus university (Italy) Alessandro Figus. Practice of the invitation of foreign professors will be continued after the termination of a pandemic.

Primary way of implementation of the academic mobility of teachers and employees of a KarIU is their sending in partner higher education institutions and the organizations of education for: lecturing, training and consultations; participation in scientific work within joint scientific projects; participation in development programs; passings of training in the period of sabbatical

leaves; participation in conferences and seminars.

The Karaganda industrial university conducts active work in the field of expansion of the international contacts. Stable relations on carrying out scientific and study with the leading higher education institutions of the CIS which list is presented on the website (<https://tttu.edu.kz/parcontracts/>) are established. In 2021 E.A. Panin gave lectures the Belarusian state technological university on a subject of researches. A.V. Volokitin has passed a scientific and pedagogical training in the Belarusian state technological university.

The main criteria for selection of partner higher education institution, as well as the foreign consultant, existence of own similar researches in the sphere of the nanomaterials and nanotechnologies similar to the scientific direction of the doctoral candidate and TS of department is. So, for example, in 2021 the contract on cooperation with the Northeast federal university (Yakutsk, Russia) from which A. Denisov's doctoral candidate as the foreign scientific consultant has chosen the associate professor of Smagulovu S.A. has been signed. The doctoral candidate at the same time was guided by similarity of scientific interests – graphene and thin films.

Basis of realization of the academic mobility of foreign teachers is interuniversity cooperation, joint articles (<https://drive.google.com/drive/folders/0ANjTcW-wdfB3Uk9PVA>) are as a result published.

OP TS periodically give open classes according to the approved schedule of mutually visits in readable disciplines, applying innovative methods of training to development by doctoral candidates of abilities, skills and special competences. So, for example, on November 5, 2021 the associate professor "Metal Forming" Pan-other E.A. has held a master class on the subject "Technology and Equipment of Processes Metal Forming" for TS and students of faculty (<https://tttu.edu.kz/2021/11/master-klass-na-temu-texnologiya-i-oborudovanie-processov-omdmaster-class-on-technology-and-equipment-of-pressure-treatment-of-materials-processesmetaldardi-kisimmen-ohdeu-procesterin/>).

On February 25, 2022 associate professor kaf. A Metal forming Zh.K. Amanzholov has given open classes "Search of himself or wake in yourself the leader" [https://www.instagram.com/p/CabzCeTu35y/?utm\\_medium=copy\\_link](https://www.instagram.com/p/CabzCeTu35y/?utm_medium=copy_link). 18.10.2021 G.E. Akhmetova gave open classes in discipline "Forming of properties of nanomaterials". The schedule of mutually visits and a response on open occupation are attached (<https://drive.google.com/file/d/1sYUZVGdzX6cySs0HqRsX1IBcukxULa1V/view?usp=sharing>; [https://drive.google.com/file/d/13SDw\\_wrskZwb2ZI1djs6ZeKFPxXxUUb3/view?usp=sharing](https://drive.google.com/file/d/13SDw_wrskZwb2ZI1djs6ZeKFPxXxUUb3/view?usp=sharing))

the university there is automated – the information system "Platonus" on which modular object-oriented dynamic educational environment "Moodle-Modular Object-Oriented Dynamic Learning Environment" educational cases, certificates and other materials TS for doctoral candidates (<https://dot21.uniweb.kz/>) are placed. According to the reference ([https://docs.google.com/document/d/126qvXsYi\\_YLsp622beCLEvfQCcc12t0r/edit?usp=sharing&oid=115134854348848244019&rtpof=true&sd=true](https://docs.google.com/document/d/126qvXsYi_YLsp622beCLEvfQCcc12t0r/edit?usp=sharing&oid=115134854348848244019&rtpof=true&sd=true)) information on principal views of DER (digital educational resources) applied at Metal forming department is available.

By results of the questioning which is carried out by EEC TS are satisfied with the created opportunities for professional and personal height of 100% of respondents.

### ***Analytical part***

On assay values of the provided materials EEC notes existence in the university of the objective personnel policy which allows to carry out completion of the implemented educational program by the qualified teachers to compliance of strategy of higher education institution and specifics of OP. All procedures of the personnel policy of higher education institution are transparent and available, strictly documented and meet the relevant requirements of the legislation.

The faculty meets the qualification requirements. All teachers serving the accredited OP on the main subjects have skills development, including on modern educational technologies with use of ICT.

Educational process is carried out according to the principles of studentcentrirovanny training that is confirmed by the high satisfaction of students revealed at their questioning during EEC visit.

In the analysis of the provided data it is established and during interviewing TS it is confirmed that higher education institution OP TS, including young teachers who are given a training opportunity in doctoral studies give opportunities of career development and professional development. The higher education institution promotes various forms of developing the skills of teachers, including abroad and in online the mode according to the approved plan, the school of pedagogical skill for young teachers, mentoring functions. At the same time, it should be noted that teachers do not participate in a competition in the program of post-doctoral studies.

the university the system of motivation and encouragement of personnel functions that allows to stimulate research and other types of activity TS. At the same time, it should be noted that, the mechanism of motivation of professional and personal development the TS are not adapted to current trends of stimulation TS.

Results of visit by members of EEC of classes of teachers were confirmed by their great professional skills and ability to use modern hardware components of training. Existence in higher education institution own the PLATONUS and LMS Moodle AIS educational platform, well organized training TS according to the program Erasmus + promote broad application of information and communication technologies and software by them in educational process. At the same time, it should be noted that teachers – practitioners of the relevant industries are involved in teaching insufficiently.

Members of EEC note that they the university and in particular management of OP in the activity perform cooperation with the leading foreign higher education institutions and foreign scientists, inviting them for lecturing on disciplines of the accredited OP, give classes abroad and also carry out external and internal academic mobility. At the same time, it should be noted that the procedure and selection criteria of the invited teachers are not improved.

TS of Metal forming department make a contribution to development of economy, formation, sciences and the cultures of the region and country. It is promoted, the carried-out scientific projects which results are used for training of graduates who are distributed on the enterprises of the republic. TS of department make the contribution to development of the region and republic through participation in professional societies, associations, academies .

The teachers participating in realization of the accredited OP take active part in various public, scientific and methodical and research, cultural and mass and other actions of the region and Republic. At the same time, it should be noted the insufficient number and quality of requests for grant financing of research works with the subsequent participation in a competition of projects.

***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- for development of scientific and creative potential to give opportunities of career and professional development the TS, including young teachers (to develop the program of post-doctoral studies with a possibility of payment of a grant) during all period of validity of accreditation;

- develop and realize the mechanism of motivation of professional and personal development TS (to consider a position the teacher-researcher, etc.) during all period of validity of accreditation;

- To higher education institution to develop the procedure and selection criteria of the invited teachers, to define degree of their involvement into advance of culture of quality and the academic honesty in higher education institution and also their contribution, in achievement of the goals of OP during all period of validity of accreditation;

- to the management of OP, considering requirements of modern labor market, to involve in teaching practitioners of the relevant industries during all period of validity of accreditation;

- increase quantity and quality of requests for grant financing of research works with the subsequent participation in a competition of projects during all period of validity of accreditation.

***EEC conclusions by criteria :***

According to the Faculty standard the educational program 8D07101 – *Nanotechnologies in engineering* has 9 satisfactory positions and 1 assumes improvement.

**6.8. Educational Resources and Systems of Support of Students standard**

✓ *The higher education institution should guarantee compliance of educational resources, including material, and infrastructures to the purposes of the educational program.*

✓ *The management of OP should show presence of the audiences, laboratories and other objects equipped with the modern equipment and providing achievement of the goals of OP.*

*The higher education institution should show compliance of information resources to requirements of higher education institution and the realized OP, including in the following directions:*

✓ *technological support of students and TS according to educational programs (for example, online training, modeling, databases, programs of the analysis of data);*

✓ *library resources, including fund of educational, methodical and scientific literature for the general education, basic and main subjects on paper and electronic media, periodicals, access to scientific databases;*

✓ *examination of results of SRW, outlet works, theses on plagiarism;*

✓ *access to educational Internet resources;*

✓ *functioning of WI-FI in the territory.*

✓ *The higher education institution should show that it creates conditions for carrying out scientific research, integration of science and education, publications of results of research work TS, employees and students.*

✓ *The higher education institution should aspire to that the educational equipment and software used for development of educational programs were similar with used in the relevant branches of economy.*

✓ *The management of OP should show existence of procedures of support of various groups of students, including informing and consultation.*

✓ *The management of OP should show existence of conditions for advance of the student on an individual educational trajectory.*

✓ *The higher education institution should consider needs of various groups of students (the adults working, foreign students and also students with special educational needs).*

✓ *The higher education institution should provide compliance of infrastructure to safety requirements .*

***Evidential part***

The management of OP together with the management of higher education institution on a constant basis providing with bases the practitioner create conditions for ensuring sufficiency of materials rooms of resources and infrastructure for carrying out scientific research, to integration of science into educational process, the publication of results of research work of employees and students.

The university carries out preparation according to 51 educational program (EP), including: 25 OP bachelor degrees, 24 OP magistracies and 2 OP doctoral studies. 3 faculties, 11 departments and 1 scientific structural unit – DSI&IR are a part of the university.

The contingent of students of day form of education for March 28, 2022 makes only 1049 people, of them: on the basis of the state educational grant – 808. Students of remote form of education – 687, evening form of education – 35. Undergraduates – 62, from them by the state order 40, doctoral candidates – 13, from them by the state order 13 .

The KarIU has a number of educational and laboratory housings with a total area of 44.01 thousand sq.m. where educational audiences, specialized offices and laboratories, the museum of the university, 20 computer classes, including the center "are placed by CISCO. The sports complex of the university, with a total area of 2300 sq.m., includes 6 game halls and 2 open areas.

Constantly application of the licensed packages of application computer programs extends. For the studying all specialties all types of studies, including design, research and dissertation works are supported by modern software packages - KOMPAS, DEFORM, SimuFact Forming, virtual exercise machines of SIKE (Magnitogorsk, the Russian Federation), etc.

the university there is a free Internet connection for students, teachers and employees, zones of open Wi-Fi, the website of the university - <https://ttu.edu.kz/> works.

One of the main advantages of the university is existence of the modern educational and scientific laboratory base including the only trial platforms in RK with semi-industrial units and installations reproducing the closed cycle of metallurgical processes and metal working processes by pressure.

On the basis of the university the Laboratory of the engineering profile "Electronic Microscopy and Nanotechnologies" works. In 2018 the 3D laboratory - engineering and the information and communication center "SOTSBI" has been open. At the same time in LINDENS of "EMiN" work on preparation for passing of the procedure of accreditation is carried out now.

The classroom fund of department completely satisfies the design capacity accredited by OP. The department has own computer class, besides, doctoral candidates and teachers of department can use computer classes of the university at any time. The modern computers which are available in computer classes are provided with an outlet in Internet and local network of the university. Computer classes are available and after hours. The software includes modern software packages and completely answers OP purpose.

The KarIU has access to such international information resources as, Web of Science, Scopus that expands the range of use of electronic research resources. TS and students have access to these resources at any time, including after-hour.

The management of OP has enough the audiences, laboratories and other objects equipped with the modern equipment providing achievement of the goal and problems of OP.

Planning of development of materials rooms of resources for the accredited OP is carried out as follows. At a faculty meeting at the end of the academic year the analysis of resources, available OP (audiences, laboratories, computers, the necessary equipment, training materials, etc.) is carried out and on the basis of the carried-out analysis the request for acquisition of materials rooms of resources is formed.

The total area of educational and laboratory premises of Metal forming department is 855 sq.m. Are a part of these rooms: educational laboratories, teaching, educational audiences, computer class.

The university has the following material and technical resources (<https://ttu.edu.kz/scintactivity/lep/>) which all students on OP NvI have free access: Tablet hydraulic press; High-precision ACCUTOM cutting machine of Struers; Multipurpose complex measuring "RIKOR" (Russia); Spectrometer of spark SPEKTROLAB; Analytical laboratory sifting machine; Ball planetary mill; Installation for electrolytic thinning of TENUPOL;



Vibration mill; Light microscope of LEICA; Termoskan-2 Installation; The Scanning / scanning JEOL 5910 electron microscope; Translucent JEM-2100 electron microscope of JEOL (Japan); Hardness gages; Heating and melting Furnaces; Gas chromatographs. License programs of final and element modeling DEFORM 3D and Simufact Forming; Swedish Termocalc program for modeling of high-temperature processes.

a KariU there is a Network Academy Cisco which is carrying out communications with the Cisco Systems Inc. company now - the world leader in the field of network decisions. The program of training allows listeners to seize all necessary knowledge in the field of modern network technologies.

development of OP the need for new information resources appears therefore on a constant basis in a KariU the development of digital resources is carried out. These requirements are considered at a faculty meeting then the decision on inclusion of necessary information resources in a comprehensive plan of development of OP is made.

The edition of electronic textbooks which are placed in library practices in the university and are in free access. For copyright compliance, to authors the certificate on this edition is issued.

At faculty meetings the question of performance of a comprehensive plan of development is considered. The fund of the main educational and scientific literature for each profile of preparation taking into account degree of an *ustarevayemost* is annually updated. Literature is completed by means of purchase, viewing "Price lists" of publishing houses and book-selling organizations, due to replenishment of textbooks and study guides of the teachers of the university published from means of the university.

Thus, the analysis of sufficiency of resources and systems of support of students is carried out on a constant basis, during all academic year. Results of this analysis are considered in the end of the year at a faculty meeting and come down in the Act of readiness of department.

The university constantly seeks for increase in level of use of information technologies in the organization of educational process. The control system of educational process an AIS of "Platonus" and LMS "Moodle" functions. For each student the access to information on the studied disciplines is provided.

Library resources, including fund of educational, methodical and scientific literature for the general education, basic and main subjects on paper and electronic media, periodicals, access to scientific databases conform to requirements to educational activity.

The university has modern library and the reading room in which fund there are more than 292 thousand copies of educational, educational and methodical, scientific literature on Kazakh, Russian and foreign languages, 25 names of newspapers and magazines are annually written out. The library of the university is in the main academic building of higher education institution. In the hall of the periodical press which is located in the subscription there are 12 computerized mounting faces, with a possibility of Internet connection and access to electronic resources of library. The reading room is designed for 42 reader's places. The fund of the reading room is located in 2 tiers in a systematic order that provides completeness of disclosure of funds and their availability to readers.

For convenience of readers on the subscription and in the reading room there is an access of Wi-fi.

The structure of library stock of the accredited OP is given in tables 2 and 3

2 Data on library resources of higher education institution, including, in a section of the accredited OP

№	Name of an indicator	Indicator
1	Quantity of mounting faces <i>in</i> library, including computer classes	117
2	Book fund	

	In total kaz/rus	113918/177408 pieces.
	Educational kaz/rus	66534/82694 pieces.
	Educational and methodical kaz/rus	44356/52600 pieces.
	Scientific kaz/rus	3028/42114 pieces.
	on electronic media	67423 pieces.
3	The means spent for acquisition of educational literature and periodicals for the reporting period of 2020-2021.	12821659 tenges
4	Book fund (separately on each accredited OP), according to Paragraph 2 8D07101 of Nanotechnologyengineering	
	Book fund	1658
	In total kaz/rus/ang	274/1242/142 pieces.
	Educational kaz/rus/ang	145/598/74 pieces.
	Educational and methodical kaz/rus/ang	78/452/43 pieces.
	Scientific kaz/rus/ang	51/192/25 pieces.
	on electronic media	23 pieces.

3 The TS editions during 2017-2021 (textbook, manuals, monographs, UMP) used in educational process in a section of the accredited OP

OP	Total number of copies	On training languages		
		kaz. language.	Russian yaz	inostr. language.
NvI	the number of names of books - 25 (a total number of copies - 50)	16	20	14

library of a KarIU, permanent book exhibitions are organized: "The higher education in Kazakhstan", "For the aid to the student", "Literature novelties", "New literature in English", "Works of teachers of the university", "Independence tops" and many others which are systematically updated. All book exhibitions are issued in 3 languages. In order that teachers and students have directly got acquainted with new literature Open viewings books, Days of information, Days of the specialist will be organized. In process of receipt of new literature the bulletins "Literature Novelties" are uploaded to the website of a KarIU, reviews of scientific and technical magazines, photo reports of novelties of literature of <https://ttu.edu.kz/scintactivity/library-2/byulleten-novix-postupleniybulletin-of-nereceptszhañabasilimdar-byulleteni/become>.

The fund of the main educational and scientific literature for each profile of preparation taking into account degree of an ustarevayemost is annually updated. Literature is completed by means of purchase, viewing "Price lists" of publishing houses and book-selling organizations, due to replenishment of textbooks and study guides of teachers of the KarIU published from means of the university. Partially the fund is replenished with scientific library at the expense of the publishing center of Association of higher education institutions of RK. Besides, the university in 2017-2018 academic year has received gratuitously 1485 copies (17 names) of books from public fund for the 100 best textbooks of the world in Kazakh program and in 2018-2019 academic year of 1260 copies (30 names). In the current year was new literature in the OP direction including in English of the edition of 2021 also purchased.

Questions of security with educational, scientific and educational and methodical literature and also of improvement of laboratory base of the university are regularly considered at a meeting of the Academic council at the beginning of each academic year.

Students and teachers of the university have an opportunity for thematic search of materials, acquaintance with the existing world and scientific and information resources for the

choice of information which is the most suitable on the OP.

Examination of results of SRW, outlet works, theses on plagiarism is made by means of the Antiplagiat system created by the Russian company JSC Antiplagiat especially for higher educational institutions. By results of the carried-out expertize the document which copy is stored at department is issued.

Readers of library can use free of charge electronic resources of Republican Interuniversity electronic library. The scientific library of a KarIU has access to such international information resources as, Scopus, Web of Science that considerably expands the range of use of electronic resources.

Internet access is provided the fiber-optic KazRena line with the allocated IP address at speeds: 300 Mbps entering and 300 Mbps outgoing.

Internet access in hostel No. 1.2 and fizkorporuska is provided the fiber-optic KazRena line. In academic buildings "Main", "New" and "Housing A" is functioned points of wireless distribution of the Internet of Wi-fi. In hostel No. 1 the 9th point functions and on the 2nd hostel the 7th point of distribution of the Internet of Wi-fi functions. Now in the central server functions the 6th servers which are used for ensuring work of the educational DALLES and PLATONUS portals, control the Internet of traffic and replication of the valuable data.

Higher education institution the TS, employees and students create conditions for carrying out scientific research, integration of science and education, the publication of results of research work.

Research work at Metal forming department is carried out according to the plan of SRW which includes the financed and not financed SRWs, preparation of reports and participation in scientific and technical conferences .

SRW of Metal forming department is carried out on the basis of Comprehensive plans of development of department and university. In individual plans TS work on performance economic contractual and state low-cost (financed and not financed) by that, on preparation of scientific articles, requests for inventions, reports on scientific both academic and research conferences and seminars is without fail planned.

Results of SRW are made out in the form of monographs, manuals, scientific articles, requests for useful models and inventions, reports at scientific and technical conferences of various level (including international), regularly published in republican and foreign magazines, collections of works. Lists of works and monographs TS are available according to the reference ([https://drive.google.com/drive/folders/1zjUDRjdXNq\\_7-9F3o\\_JVNWaRACa-sTih?usp=sharing](https://drive.google.com/drive/folders/1zjUDRjdXNq_7-9F3o_JVNWaRACa-sTih?usp=sharing)).

Metal forming department have sufficient material and technical resources which allow to provide completely with a laboratory workshop all studied disciplines. At departments there are laboratory and research stands as leading manufacturing firms, and made by forces TS and students.

Technological support of students of the university is provided in various ways. For example, granting an opportunity to use license program complexes for mathematical modeling of some processes of Thermo-calc, Simufact forming, Deform. The KarIU also provides to all students open access to scientometric databases of the publication, for example, of Scopus and WOS.

The management of OP and the university provides existence of all necessary procedures of support of various groups studying with various requirements including informing and consultation which are regulated by the Law of RK "About Education" and others the NPA of Kazakhstan .

Within introduction of inclusive education in a KarIU the ramp device is made; device of contrast marking of the first and last steps of ladder marches; the device of hand-rail for physically disabled people in a bathroom; the device of hand-rail on ladder marches the

increased and rounded off departure. And also the Plan of measures on the level of availability to persons with special educational needs for 2021-2022 which includes is developed: the device of a tactile tile for orientation in the movement of visually impaired people; the room equipment under library with division of zones for pupils with limited opportunities; installation in audiences of a light signaling device of a call.

each academic building of the university there is a system of video surveillance and an electronic throughput system. The movement of students, TS and the staff of the university through a turnstile is fixed in the separate database.

By results of the questioning TS which is carried out by EEC are satisfied with sufficiency and availability of necessary scientific and educational literature in library of 100% (it is very good - 29.4%), the level of the created conditions considering needs of various groups of students - 100%, work on the organization of medical care and prevention of diseases in higher education institution – 100%.

By results of the questioning TS which is carried out by EEC are satisfied with the existing educational resources of higher education institution - 100%; educational offices, audiences for big groups – 100%; recreation rooms for students – 92.3%; computer classes and the Internet resources – 100%; the available scientific laboratories – 100%; the hostel – 84.6%, equipment of library and sufficiency of fund of scientific, educational and methodical literature – 100%, the level of availability of library resources - 100%, quality of the rendered services in libraries and reading rooms – 100%, availability of services of health care – 92.3%, Quality of medical care in higher education institution – 100%.

### ***Analytical part***

On the basis of studying the submitted normative documents, videos, interviewing and questioning TS and students the commission has come to conclusion that the university and the management of OP carry out purposeful work on providing the educational, information and educational environment.

Lecture audiences and educational laboratories are equipped with interactive boards, projectors, multiple copying devices, personal computers are united in local network, free access of Wi-fi is provided. Laboratories are equipped with the modern equipment. Significant increase in material equipment of department for the last 5 years is observed. The high quality and accuracy of measurements allows to use the laboratory educational equipment and software for scientific research. Results of scientific works TS and students are used in educational process. At the same time, it should be noted, insufficiency of resources (material, infrastructures), considering specifics of the sphere of scientific research (that dissertation works).

At rather good level the information support of educational and scientific and educational activity with access to full text electronic resources of educational and scientific value which satisfies inquiries of students and TS is carried out. In a KarIU the examination of outlet works, including on plagiarism, free access to the Internet to resources and WI-FI throughout the territory functions. At the same time, it should be noted that, considering a new format of holding entrance examinations doctoral studies, there is no informing and consultation on the matter.

The university, conditions for advance of students on an individual trajectory of training, support of special needs of students and TS of various groups, including with OVZ and also infrastructure for safety are created. At the same time, it should be noted that in most educational laboratories account of the log entry of safety measures is not kept.

### ***Strengths / the best practice on OP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

### ***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- To higher education institution provide compliance of educational resources, including material, and infrastructures to the purposes of the educational program "8D07101" of Nanotechnology in engineering, considering specifics of the sphere of scientific research a date of performance by 01:01. 2024.;

- To provide to the management of OP the procedure of support of various groups of students, including informing and consultation, for example: holding the training seminars for entrance examinations in doctoral studies on a periodic basis by the beginning of academic year;  
- keep account of the log entry of safety measures in the course of training a date of performance by 01:09. 2022.

***EEC conclusions by criteria :***

According to the Educational Resources and Systems of Support of Students standard the educational program 8D07101 – *Nanotechnologies in engineering* has 11 satisfactory positions and 2 assumes improvement.

**6.9. Informing Public standard**

✓ *Information published by higher education institution should be exact, objective, relevant and reflect all activities of higher education institution within the educational program.*  
✓ *Informing the public should provide support and explanation of national development programs of the country and the system of the higher and postgraduate education.*

✓ *The management of higher education institution should use various methods of dissemination of information (including media, web resources, information networks other) for informing the general public and interested persons.*

*The information published by higher education institution about the educational program should be objective and relevant and include:*

- ✓ *the purpose and the planned results of OP, the appropriated qualification;*
- ✓ *data and system of estimation of educational achievements of students;*
- ✓ *data on programs of the academic mobility and other forms of cooperation with partner higher education institutions, employers;*
- ✓ *data on opportunities of development of personal and professional competences of students and employment;*
- ✓ *the data reflecting positioning of OP in education market (at the regional, national, international levels).*
- ✓ *Important factor is the publication on open resources of reliable information about TS, in a section of a personnel.*
- ✓ *The higher education institution should publish on own web resource the audited financial statements on OP.*
- ✓ *The higher education institution should place information and references to external resources by results of procedures of external assessment.*
- ✓ *Important factor is placement of information on cooperation and interaction with partners, including with the scientific/consulting organizations, business by partners, social partners and the organizations of education.*

***Evidential part***

NLC “KarIU” openly places information on the mission, the purposes, tasks and activity of all structural units of the university on all possible data carriers: on the official website of the university and in various electronic and printing editions of republican, regional and regional scales. The university will organize scientific seminars and conferences at which the public has an opportunity to examine activity of the university, its policy and strategy.

Providing data to placement on the Internet KarIU resources, except the data placed by educational divisions and teachers on the educational portal is carried out by all interested structural units of the university. Information is provided in the Kazakh, Russian and English languages.

The blog by the rector where visitors of the website have an opportunity to post the questions and appeals acts on the homepage of the website of a KarIU. On pages of faculties and departments contacts of managers of departments and teachers are specified.

The KarIU purposeful work on informing the public on activity of the university, conditions and features of realization of EP is carried out.

Frequency of informing the public depends from: requirements and relevance of information on people, events, facts, phenomena, processes; interest of the public; social value of information; changes of the development strategy of the university; entering of innovations into organizational structure of the university and changes in a control system; changes in process of providing educational service; modification of documentation of a quality management system, etc.

The satisfaction of interested persons as the obtained information and in its completeness is investigated by carrying out questioning in the online mode (<https://ttu.edu.kz/anketi-oprosniki/>).

Informing the public provides the support and explanation of national development programs of the country and the system of the higher and postgraduate education which is carried out by means of participation of staff of higher education institution in forums of various level, actions, round tables, etc. For example, on the website of a KarIU the National program "Rowhani Zha to a Yr" (<https://ttu.edu.kz/ruxani-zha%D2%A3%D2%93iru/>) is lit and the anti-corruption strategy of the Republic of Kazakhstan for 2015-2025 (<https://ttu.edu.kz/korrupciy/>) is explained. Also, the website contains references to the MES RK the Lighting Development Programs of a System of the Higher and Postgraduate Education resources.

The management of higher education institution uses various methods of dissemination of information, including media, web resources, information networks for informing the general public and interested persons.

Instruments of informing are: Republican magazine "Vestnik Karagandinskogo Gosudarstvennogo Industrialnogo Universiteta"; "KMIU studentteren habarshysy" newspaper, website of the <https://ttu.edu.kz/scintactivity/vestnik/> university; social networks (<https://www.facebook.com/profile.php?id=100022651051239>, <https://ok.ru/profile/579438130734>, [https://www.instagram.com/kariu\\_kz/?utm\\_medium=copy link](https://www.instagram.com/kariu_kz/?utm_medium=copy_link), <https://www.youtube.com/channel/UCIDmc-HaCuffHhCUhtfwJtQ/featured>); printing materials (brochures, booklets, bulletins etc.); reports; posters, stands; letters; thematic articles in media; press releases in media; advertizing in media; polls; days of "Open doors"; excursions; seminars, conferences; exhibitions, fairs, exposures; an interview in media, on radio or television; presentations; information stands in the territory of academic buildings, personal contacts with interested parties, etc.

The information published by higher education institution within EP is objective, relevant and includes: the purpose and the planned results of EP, with the indication of the expected results of training and information on a possibility of assignment of qualification on the termination of EP ([https://drive.google.com/file/d/1x4W639MgGB-\\_KfAbGnHK3SDvg9GsD/view?usp=sharing](https://drive.google.com/file/d/1x4W639MgGB-_KfAbGnHK3SDvg9GsD/view?usp=sharing)); data on the system of estimation of educational achievements of students (<https://kgiu.kz/student/putevoditel-studenta-kgiu/>; <https://ttu.edu.kz/education/sistema-ocenki-znaniy-studentovstudent-assessment-systemstudentterdi%D2%A3-bilimin-ba%D2%93alau-zh%D2%afyesi/>). Data on programs of the academic mobility in a KarIU are defined by organizational methodical support and also procedures of recognition of the periods of training of doctoral candidates of PhD, teachers-researchers of a KarIU in other higher education institutions (including foreign) within the academic mobility of [https://drive.google.com/file/d/1poCymFlsOWujsQACCwV7eD\\_iXVj7c3Vv/view](https://drive.google.com/file/d/1poCymFlsOWujsQACCwV7eD_iXVj7c3Vv/view). The KarIU informs the public on cooperation and interaction with partners within EP, including with the scientific/consulting organizations, business by partners, social partners and the organizations of

education. For example, the list of the leading higher education institutions of the CIS and the world with which contracts on cooperation (<https://tttu.edu.kz/2021/12/karagandinskiy-industrialniy-universitet-rasshiraetmezhdunarodnoe-sotrudnichestvo%20%9bara%20%93andi-industriyali%20%9b-universiteti-xali%20%9barali%20%9b-intima%20%9btasti%20%9bti-ke%20%a3eytude/>), [the list of the signed contracts and memorandums with the city-forming enterprises, representatives of large and medium business](#) for practical training of the studying KarIUs (<https://tttu.edu.kz/2021/04/sotrudnichestvo-vuzov-i-ao-arselor-mittal-temirtau-vazhniy-faktor-v-oblasti-podgotovki-visokokvalificirovannix-specialistov/>) [are signed are given in the website. Also, information on the new facts of cooperation and interaction is published in a news feed of the website and social networks.](#)

Employment of students is a significant indicator of overall performance of our university. The KarIU constantly pays close attention to this direction of activity that is reflected in the systematic improvement and development of a system of assistance of employment training and annually high percent of the employed training. Curricula vitae of graduates are posted on the official site of a KarIU and also the vacancies which are available at the enterprises of the region are monthly updated. On the website of the university and social networks takes place and operational information on existence of vacancies at the enterprises of the city and area is carried to graduates.

Within academic year, class reunions with employers will be organized and held, tours to the enterprises of the region and also questioning of graduates for the purpose of studying the most current problems concerning questions of employment are conducted;

Following the results of the National rating of the best technical colleges of Kazakhstan according to Independent quality assurance agency in formation (IQAA) of a KarIU in 2020 (<https://iqaa-ranking.kz/rejting-vuzov/rejting-vuzov-kazakhstan-2020/natsionalnyj-rejting-luchshikh-tekhnicheskikh-vuzov-kazakhstan-4>) [and in 2021 \(https://iqaa-ranking.kz/rejting-vuzov/rejting-vuzov-kazakhstan-2021/natsionalnyj-rejting-luchshikh-tekhnicheskikh-vuzov-kazakhstan\)](#) has taken the 9th place, thereby having been included in the top ten technical colleges of the Republic of Kazakhstan .

On the website of a KarIU (<https://tttu.edu.kz/>) [it is published](#) adequate and objective information about EP TS, in a section of a personnel. Information about TS contains data on education, academic degrees and ranks, the taught disciplines, a contact information, etc. For example, information about TS — Nanotechnologies in Engineering of Metal forming department is available to EP 8D07101 according to the reference <https://tttu.edu.kz/omd/structure/>.

The university publishes on a web resource the audited financial statements on EP (<https://drive.google.com/file/d/19IRPJzJ8Q3uehny7z2mLH6mIgm96hog/view>).

The reporting meeting of the Chairman of the board – the Rector of the Karaganda industrial university B. Abdrasilov before the public on which the new personnel policy of higher education institution and results of financial and economic activity (<https://tttu.edu.kz/2021/11/sostoyalas-otchetnaya-vstrecha-rektora-karagandinskogo-industrialnogo-universiteta-b-abdrasilova-pered-obshhestvennostyuareporting-meeting-of-the-rector-of-karaganda-industrial-university-b-abdras/>) have been in detail lit is published on the website.

KarIU and the realized OP of doctoral studies took part in the rating of the Independent Agency of accreditation and rating (IAAR) and has received 1 place. The university undergoes the given procedures of external estimates on a voluntary basis (<https://iaar.agency/rating/1/0/2021>).

The quality management system of a KarIU is certified on a compliance with requirements of ST of RK ISO 9001-2016 (ISO 9001:2015) "A quality management system. Requirements" in relation to educational activities for training in the sphere of technical, professional, postsecondary, higher and postgraduate professional education (<https://tttu.edu.kz/abuniv/qms/>).

Important factor placement of informing the public on cooperation and interaction with partners, including with the scientific-consulting organizations, business partner, social partners and the organizations of education. For example: signing of memorandums of interaction with four Hungarian higher education institutions – such is result of active participation of the Karaganda industrial university in the Hungarian-Kazakhstan forum of rectors which has passed in Budapest (<https://tttu.edu.kz/?s=%D0%92%D0%B7%D0%B0%D0%B8%D0%BC%D0%BE%D0%B4%D0%B5%D0%B9%D1%81%D1%82%D0%B2%D0%B8%D0%B5+%D1%81+%D0%BF%D0%B0%D1%80%D1%82%D0%BD%D0%B5%D1%80%D0%B0%D0%BC%D0%B8>), creation of conditions for preparation and retraining of personnel providing increase in innovative activity in a system of education and science, commercialization of results of scientific research, the joint organization of academic and research conferences and seminars, joint participation and development of programs of the international cooperation in science of innovative technologies, integration into world scientific and educational and information systems, development of joint scientific projects for participation in competitions of the international funds and organizations and also the organization and carrying out distance learning.

### ***Analytical part***

On assay values of structure and contents of the website, pages on social networks, materials of the report of Metal forming department of a KarIU, EEC notes that the university shows policy of objectivity, transparency, openness, relevance in the field of informing the public participants of educational process.

At all levels of dissemination of information there is an explanation of national development programs of the country and the system of the higher and postgraduate education. At the same time, it should be noted that the purpose and the planned results of EP is not corrected, considering its objectivity and relevance.

The management of OP uses for dissemination of information of means of media, social networks. On the page of Metal forming department of a KarIU of the official site all necessary information for participants of educational process on OP 8D07101 – Nanotechnologies in engineering and full information about TS is placed.

On the website of higher education institution data on activity of higher education institution, including financial statements are published. The university and the management of the accredited educational programs take part in national and international ratings, information on which is also posted on the website by a KarIU. At the same time, it should be noted that the program of commercialization in education market is not developed (at the regional, national, international levels).

On the basis of the analysis of contents of separate pages of the website, EEC notes that the Association of graduates of a KarIU needs to provide fuller and objective information about the work.

### ***Strengths / the best practice on EP 8D07101 – Nanotechnologies in engineering:***

Strengths are noted.

### ***Recommendations for EP 8D07101 – Nanotechnologies in engineering:***

- information on the educational program (purpose and the planned results of OP) published by higher education institution to correct, considering its objectivity and relevance a date of performance by 01/09/2022.

- enter the program of commercialization in education market (at the regional, national, international levels) a date of performance by 01/01/2023.



***EEC conclusions by criteria :***

According to the Informing Public standard the educational program 8D07101 – *Nanotechnologies in engineering* has 10 satisfactory positions and 2 assumes improvement.



**(VII) THE OVERVIEW OF STRENGTHS / THE BEST PRACTICE  
ACCORDING TO EACH STANDARD**

*According to all standards for EP 8D07101 – Nanotechnology in engineering of strengths is noted.*



## **(VIII) OVERVIEW OF THE RECOMMENDATION ABOUT IMPROVEMENT OF QUALITY ON EACH STANDARD**

### **According to the Management of the Educational Program standard:**

#### ***Recommendations for EP 8D07101 – Nanotechnologies in engineering:***

- reconsider and update in the register: EP purpose in terms of identity, uniqueness and relevance of EP, considering requirements of modern labor market (this interpretation of the purpose can belong to any other educational program as has no distinctive features that excludes specifics of EP) i.e. to concretize; the name EP considering as current trends of development of professional activity and own original directions of researches, and for attractiveness of EP to applicants and employers. Correct the formed results of training of EP, they should be achievable and commensurable a date of performance by September, 2022;

- for productive risk management the management of EP needs to execute a complex of actions, namely: determine the list of the professional standards (PS) by the accredited EP; carry out compliance of professions, the PS labor functions with results of training in disciplines of the educational program (indicators of achievement of the RHO); abilities, skills on PS with the formed results of training within EP a date of performance by September, 2022;

- provide management of innovations within EP, including the analysis and introduction of innovative offers. Define mechanisms of support and stimulation of initiatives of commercialization of the scientific projects having innovative focus during all period of validity of accreditation.

### **According to the Management of Information and Reporting standard**

#### ***Recommendations for EP 8D07101 – Nanotechnologies in engineering:***

- develop an accurate algorithm of actions for providing with all necessary information in the respective areas of sciences on the accredited OP (the latest developments, competitions and grants on scope of a research, training foreign and within the country, etc.) a date of performance by **September, 2023;**

### **According to the Development and Approval of the Educational Program standard**

#### ***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- for positioning of OP "8D07101" of Nanotechnology in engineering in the educational market, (regional/national/international) and also demonstrations of its uniqueness to the management it is necessary (to cooperate expansion of borders of the research sphere with domestic and foreign laboratories, scientific centers, institutes which conduct related researches) a date of performance by **June 30, 2023.**

### **According to the Continuous Monitoring and Periodic Assessment of Educational Programs standard**

#### ***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- to support services of the purpose of OP to develop the procedure of maintenance of the educational environment the corresponding documentation (letters of consent to the guide of foreign consultants as the basis for the order on subjects of theses of PhD, updating the conclusion of new contracts and memorandums of cooperation with foreign and domestic Higher education institutions and laboratories, etc.) a date of performance by June 30, 2023.

**According to the Studentcentrirovanny Training, Teaching and Gain Score standard**

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- ensure functioning on carrying out own researches in the field of a technique of teaching subject matters for this OP during **all period of validity of accreditation;**
- fulfill and apply modern methods of assessment of results of training and to regularly improve skills in this area **during all period of validity of accreditation.**

**According to the Students standard**

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- inform and to work systemically on development of activity of Association of graduates. The graduates working in various spheres can introduce amendments and innovations in image, educational and other activity of Higher Education Institution (scholarships to successful students, the practice-focused training, the advanced information and communication technologies, etc. a date of performance by 01/01/2023

**According to the Faculty standard**

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- for development of scientific and creative potential to give opportunities of career and professional development the TS, including young teachers (to develop the program of post-doctoral studies with a possibility of payment of a grant) during **all period of validity of accreditation;**
- develop and realize the mechanism of motivation of professional and personal development TS (to consider a position the teacher-researcher, etc.) during **all period of validity of accreditation;**
- To higher education institution to develop the procedure and selection criteria of the invited teachers, to define degree of their involvement into advance of culture of quality and the academic honesty in higher education institution and also their contribution, in achievement of the goals of OP during all period of validity **of accreditation;**
- to the management of OP, considering requirements of modern labor market, to involve in teaching practicians of the relevant industries **during all period of validity of accreditation;**
- increase quantity and quality of requests for grant financing of research works with the subsequent participation in a competition of projects during **all period of validity of accreditation.**

**According to the Educational Resources and Systems of Support of Students standard**

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- To higher education institution provide compliance of educational resources, including material, and infrastructures to the purposes of the educational program "8D07101" of Nanotechnology in engineering, considering specifics of the sphere of scientific research a date of performance by 01:01. 2024.;
- To provide to the management of OP the procedure of support of various groups of students, including informing and consultation, for example: holding the training seminars for

entrance examinations in doctoral studies on a periodic **basis by the beginning of academic year;**

- keep account of the log entry of safety measures in the course of training a date of performance by 01:09. 2022.

**According to the Informing Public standard**

***Recommendations for OP 8D07101 – Nanotechnologies in engineering:***

- information on the educational program (purpose and the planned results of OP) published by higher education institution to correct, considering its objectivity and relevance a date of performance by **01/09/ 2022.**

- enter the program of commercialization in education market (at the regional, national, international levels) a date of performance by **01/01/2023.**



**(IX) RECOMMENDATION TO ACCREDITATION COUNCIL**

*Members of EEC have come to unanimous opinion that EP 8D07101 – Nanotechnologies in engineering is recommended to accreditation for a period of 5 years.*

**(X) Appendix 1. The evaluation table "Conclusion of External Commission of Experts" EP 8D07101 – Nanotechnologies in engineering**

p\p	№ p\p	Evaluation criteria	Position of the organization of education			
			Strong	Satisfactory	Assumes improvement	Unsatisfactory
<b>Management of the Educational Program standard</b>						
1	1.	The higher education institution should show development of the purpose and the development strategy EP on the basis of the analysis of external and internal factors with broad involvement of various stakeholders		+		
2	2.	The policy of quality assurance should reflect communication between scientific research, teaching and training		+		
3	3.	The higher education institution shows quality assurance cultural development		+		
4	4.	The commitment to quality assurance should belong to any activity which is carried out by contractors and partners (outsourcing) including at realization of joint/two-degree education and the academic mobility		+		
5	5.	The management of EP provides transparency of development of the development plan for EP on the basis of the analysis of its functioning, real positioning of higher education institution and orientation of its activity on satisfaction of needs of the state, employers, interested persons and students		+		
6	6.	The management of EP shows functioning of mechanisms of forming and regular revision of the development plan for EP and monitoring of its realization, assessment of achievement of the goals of training, compliance to needs of students, employers and society, the decision-making directed to continuous improvement of EP		+		
7	7.	The management of EP should involve representatives of groups of interested persons, including employers, students and TS in forming of the development plan for EP		+		
8	8.	The management of EP should show identity and uniqueness of the development plan for EP, its consistency		+		

		with national priorities of development and the development strategy of the organization of education				
9	9.	The higher education institution should show accurate definition responsible for business processes within EP, distribution of functions of personnel, differentiation of functions of collegial bodies		+		
10	10.	The management of EP provides coordination of activity of all persons who are taking part in development and management of EP and its continuous realization and also involves in this process of all interested persons		+		
11	11.	The management of EP should provide transparency of a control system, functioning of the internal system of quality assurance including its design, management and monitoring, adoption of the relevant decisions		+		
12	12.	The management of EP should exercise risk management			+	
13	13.	The management of EP should provide participation of representatives of interested persons (employers, TS, students) as a part of collegial bodies of management of the educational program and also their representativeness at decision-making concerning management of the educational program		+		
14	14.	The higher education institution should show management of innovations within EP, including the analysis and introduction of innovative offers		+		
15	15.	The management of EP should show the openness and availability to students TS, employers and other interested persons		+		
16	16.	The management of EP confirms training according to programs of management of education		+		
17	17.	The management of EP should aspire to that the progress made since the last procedure of external quality assurance was taken into account by preparation for the following procedure		+		
<b>Total according to the standard</b>				<b>16</b>	<b>1</b>	
<b>Management of Information and Reporting standard</b>						
18	1.	The higher education institution should provide functioning of a system of collecting, the analysis and management of information on the basis of modern information and communication technologies and software		+		
19	2.	The management of EP shows system use of the processed, adequate information for improvement of an internal system of quality assurance		+		
20	3.	The management of OP shows existence of the reporting system reflecting activity of all structural units and departments within EP including assessment of their effectiveness		+		
21	4.	The higher education institution should define frequency, forms and methods of assessment of management of EP, activity of collegial bodies and structural units, the top		+		

		management				
22	5.	The higher education institution should show the mechanism of ensuring information security, including definition of responsible persons for reliability and timeliness of the analysis of information and providing data		+		
23	6.	The higher education institution shows involvement of students, workers and TS in processes of collecting and the analysis of information and also decision-making on their basis		+		
24	7.	The management of EP should show existence of mechanisms of communication with students, workers and other interested persons, including resolutions of conflicts		+		
25	8.	The higher education institution should provide measurement of degree of satisfaction of requirements TS, personnel and students within EP and to show proofs of elimination of the found shortcomings		+		
26	9.	The higher education institution should evaluate effectiveness and efficiency of activity, including in EP coal mine		+		
		The information collected and analyzed by higher education institution within EP should consider:				
27	10.	key performance indicators		+		
28	11.	to the loudspeaker of the contingent of the forms and types studying in a section		+		
29	12.	level of progress, achievement of students and assignment		+		
30	13.	satisfaction of students with realization of EP and quality of training in higher education institution		+		
31	14.	availability of educational resources and systems of support to students		+		
32	15.	employment and career development of graduates		+		
33	16.	Students, employees and TS should document the consent to processing of personal data		+		
34	17.	The management of EP should promote all necessary information in the respective areas of sciences		+		
<b>Total according to the standard</b>				<b>17</b>		
<b>Development and Approval of the Educational Program standard</b>						
35	1.	The higher education institution should show existence of the documentary procedure of development EP and its statement at the institutional level		+		
36	2.	The higher education institution should show compliance to the developed EP to the established purposes and the planned results of training		+		
37	3.	The management of EP should define influence of disciplines and professional the practician on forming of results of training		+		



38	4.	The higher education institution can show existence of model of the graduate of EP describing results of training and personal qualities		+		
39	5.	The qualification appropriated on end of EP should be accurately defined, explained and correspond to the HCK, QF-EHEA certain level		+		
40	6.	The management of EP should show the modular structure of the program based on the European system of translation and accumulation of the credits (ECTS) to provide compliance of EP, its modules (according to the contents and structure) to goals with orientation to achievement of the planned results of training		+		
41	7.	The management of EP should provide compliance of maintenance of subject matters and results of training each other and to the training level (bachelor degree, a magistracy, doctoral studies)		+		
42	8.	The management of EP should show conducting external examinations of EP		+		
43	9.	The management of EP should produce the evidence of participation of students, TS and other stakeholders in development of EP, ensuring their quality		+		
44	10.	The management of EP should show positioning of OP in the educational market, (regional/national / international), its uniqueness			+	
45	11.	Important factor is the possibility of training of students for professional certification		+		
46	12.	Important factor is existence of two-degree EP and/or joint EP with foreign higher education institutions		+		
<b>Total according to the standard</b>				<b>11</b>	<b>1</b>	
<b>Continuous Monitoring and Periodic Assessment of Educational Programs standard</b>						
47	1.	The higher education institution should provide revision of contents and structure of EP taking into account changes of labor market, requirements of employers and social inquiry of society		+		
48	2.	The higher education institution should show existence of the documentary procedure of carrying out monitoring and periodic assessment of EP for achievement of the goal of EP. Results of these procedures are directed to constant improvement of EP		+		
		Monitoring and periodic assessment of EP should consider:				
49	3.	contents of programs in the context of the last achievements of science and technologies for concrete discipline		+		

50	4.	changes of requirements of society and professional environment		+		
51	5.	loading, progress and release of students		+		
52	6.	efficiency of procedures of estimation of students		+		
53	7.	requirements and degree of satisfaction of students		+		
54	8.	compliance of the educational environment and activity of support services to EP purposes			+	
55	9.	All interested persons should be informed on any planned or taken actions concerning EP. All changes made to EP should be published		+		
56	10.	Support services should reveal needs of various groups of students and degree of their satisfaction with the organization of training, teaching, estimation, development of OP in general		+		
<b>Total according to the standard</b>				<b>9</b>	<b>1</b>	
<b>Studentocentrirovanny Training, Teaching and Gain Score standard</b>						
57	1.	The management of EP should provide respect and attention for various groups of students and their requirements, granting flexible trajectories of training to them		+		
58	2.	The management of EP should provide teaching on the basis of modern achievements of world science and practice in the field of the direction of preparation, use of various modern techniques of teaching and assessment of the results of training providing achievement of the goals of EP, including competences, skills of performance of scientific work at the required level		+		
59	3.	The management of EP should define mechanisms of distribution of an academic load of students between the theory and practice within EP, ensuring development of contents and achievements of the goals of EP by each graduate		+		
60	4.	Important factor is existence of own researches in the field of a technique of teaching disciplines of EP		+		
61	5.	The higher education institution should provide compliance of assessment procedures of results of training in the planned results and the purposes of EP		+		
62	6.	The higher education institution should provide the sequence, transparency and objectivity of the mechanism of assessment of results of training of EP. Criteria and methods of assessment of results of training should be published in advance		+		
63	7.	The evaluating persons should own modern methods of assessment of results of training and regularly improve skills in this area		+		
64	8.	The management of EP should show existence of a system of return coupling on use of various techniques of teaching and assessment of results of training		+		

65	9.	The management of EP should show support of autonomy of students for the simultaneous management and the help from the teacher		+		
66	10.	The management of EP should show existence of the procedure of response to complaints of students		+		
<b>Total according to the standard</b>				<b>10</b>		
<b>Students standard</b>						
67	1.	The higher education institution should show policy of forming of the contingent of students and provide transparency of its procedures. The procedures regulating life cycle of students (from receipt before end), should be defined, approved, published		+		
68	2.	The management of EP should provide carrying out special programs of adaptation and support for just arrived and foreign students		+		
69	3.	The higher education institution should show compliance of the effects of the Lisbon convention on recognition, including existence and use of the mechanism by recognition of results of the academic mobility of students and also results of additional, formal and informal training		+		
70	4.	The higher education institution should provide an opportunity for external and internal academic mobility of students and also render them assistance in receiving external grants for training		+		
71	5.	The higher education institution should stimulate actively students to self-education and development out of a main routine (extracurricular activities)		+		
72	6.	Important factor is existence of the mechanism of support of gifted students		+		
73	7.	The higher education institution should show cooperation with other organizations of education and the national centers "To the European network of national information centers by the academic recognition and mobility / National academic Information Centres of Recognition" ENIC/NARIC for the purpose of ensuring comparable recognition of qualifications		+		
74	8.	The higher education institution should provide students with places of practice, show the procedure of assistance to employment of graduates, maintenance of communication with them		+		
75	9.	The higher education institution should show the procedure of delivery to graduates of the documents confirming the received qualification including the achieved results of training		+		
76	10.	The management of EP should show that graduates of the program have the skills demanded in labor market and that these skills are really demanded in labor market		+		
77	11.	The management of EP should show existence of the mechanism of monitoring of employment and professional activity of graduates		+		

78	12.	Important factor is existence acting associations/associations of graduates		+		
<b>Total according to the standard</b>				<b>12</b>		
<b>Faculty standard</b>						
79	1.	The higher education institution should have the objective and transparent personnel policy in EP coal mine including hiring (including invited TS), the professional growth and development of personnel, the providing professional competence of all state		+		
80	2.	The higher education institution should show compliance of qualitative structure TS to the established qualification requirements, the strategy of higher education institution, EP purposes		+		
81	3.	The management of EP should show change of a role of the teacher in connection with transition to studentcentrirovanny training and teaching		+		
82	4.	Higher education institution the TS, including young teachers should give opportunities of career development and professional development		+		
83	5.	The higher education institution should involve in teaching specialists of the relevant industries possessing the professional kompetentnost conforming to requirements of OP		+		
84	6.	The higher education institution should show existence of the mechanism of motivation of professional and personal development TS		+		
85	7.	The higher education institution should show broad application TS of information and communication technologies and software in educational process (for example, on-line of training, an e-portfolio, MOOCs, etc.)		+		
86	8.	The higher education institution should show orientation of activity on development of the academic mobility, involvement of the best foreign and domestic teachers		+		
87	9.	The higher education institution should show the involvement of each teacher into advance of culture of quality and the academic honesty in higher education institution, define a contribution TS, including invited, in achievement of the goals of EP			+	
88	10.	Important factor is the involvement TS in development of economy, formation, science and the culture of the region and country		+		
<b>Total according to the standard</b>				<b>9</b>	1	
<b>Educational Resources and Systems of Support of Students standard</b>						
89	1.	The higher education institution should guarantee compliance of educational resources, including material, and infrastructures to the purposes of the educational program			+	

90	2.	The management of EP should show presence of the audiences, laboratories and other objects equipped with the modern equipment and providing achievement of the goals of EP		+		
		The higher education institution should show compliance of information resources to requirements of higher education institution and the realized EP, including in the following directions:				
91	3.	technological support of students and TS according to educational programs (for example, online training, modeling, databases, programs of the analysis of data)		+		
92	4.	library resources, including fund of educational, methodical and scientific literature for the general education, basic and main subjects on paper and electronic media, periodicals, access to scientific databases		+		
93	5.	examination of results of SRW, outlet works, theses on plagiarism		+		
94	6.	access to educational Internet resources		+		
95	7.	functioning of WI-FI in the territory		+		
96	8.	The higher education institution should show that it creates conditions for carrying out scientific research, integration of science and education, publications of results of research work TS, employees and students		+		
97	9.	The higher education institution should aspire to that the educational equipment and software used for development of educational programs were similar with used in the relevant branches of economy		+		
98	10.	The management of EP should show existence of procedures of support of various groups of students, including informing and consultation			+	
99	11.	The management of EP should show existence of conditions for advance of the student on an individual educational trajectory		+		
100	12.	The higher education institution should consider needs of various groups of students (the adults working, foreign students and also students with special educational needs)		+		
101	13	The higher education institution should provide compliance of infrastructure to safety requirements				
<b>Total according to the standard</b>				<b>11</b>	<b>2</b>	
<b>Informing Public standard</b>						
102	1.	Information published by higher education institution should be exact, objective, relevant and reflect all activities of higher education institution within the educational program		+		
103	2.	Informing the public should provide support and explanation of national development programs of the country and the system of the higher and postgraduate education		+		

104	3.	The management of higher education institution should use various methods of dissemination of information (including media, web resources, information networks other) for informing the general public and interested persons		+		
		The information published by higher education institution about the educational program should be objective and relevant and include:				
105	4.	the purpose and the planned results of EP, the appropriated qualification			+	
106	5.	data and system of estimation of educational achievements of students		+		
107	6.	data on programs of the academic mobility and other forms of cooperation with partner higher education institutions, employers		+		
108	7.	data on opportunities of development of personal and professional competences of students and employment		+		
109	8.	the data reflecting positioning of EP in education market (at the regional, national, international levels)			+	
110	9.	Important factor is the publication on open resources of reliable information about TS, in a section of a personnel		+		
111	10.	The higher education institution should publish on own web resource the audited financial statements on EP		+		
112	11.	The higher education institution should place information and references to external resources by results of procedures of external assessment		+		
113	12.	Important factor is placement of information on cooperation and interaction with partners, including with the scientific/consulting organizations, business by partners, social partners and the organizations of education		+		
<b>Total according to the standard</b>				10	2	
<b>IN TOTAL</b>				<b>105</b>	8	