



## Accreditation Report

### **Accreditation of the double degree study programme "Processing Technologies of Materials" (22.04.02) for the specialty "Metallurgy" (M.Sc.)**

**Delivered by the Federal State Autonomous Educational Institution of Higher Education "Peter the Great Saint –Petersburg Polytechnic University"**

#### **I Accreditation procedure**

**Signing of the Contract:** 29 October, 2014

**Self-Evaluation Report submitted on:** 1 September, 2015

**Dates of the site visit:** 20-22 October, 2015

**Standing Expert Committee:** Committee for Engineering and Technical Sciences

**ACQUIN coordinator:** Nina Soroka

**Accreditation decision by ACQUIN:** 31 March, 2016

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## II Context

The experts wish to thank organizers, teachers and students participating in the reception of the Peer Group in Saint Petersburg for the opportunity to participate in the meetings, openness and readiness to answer questions. This kind of involvement is very valuable not only for the evaluation of the study programmes but also for a better understanding of the legal and socio-cultural background of the Russian system of higher education, and in particular, Peter the Great Saint Petersburg Polytechnic University (SPbPU).

The objective of the international accreditation procedure is to evaluate and recognize the high quality of offered study programmes against international accreditation standards according to European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG-ENQA). During the procedure of joint accreditation the legal norms of both countries were taken into consideration.

Special regulations (common for both countries structural regulations on accreditation of Bachelor and Master programmes, rules of the Accreditation Commission for accrediting study programmes and system accreditation) which are necessary for awarding the quality label (Urkunde) are not considered here.

In the event of successful joint accreditation NCPA's National Accreditation Board awards the Certificate of joint international accreditation of the study programme for the period of up to 6 years.

The ACQUIN Accreditation Commission (Akkreditierungskommission ACQUIN) can make the following decisions:

- Unconditional accreditation (Akkreditierung ohne Auflagen). In case of first time accreditation the term is 5 years.
- Accreditation with conditions (Akkreditierung mit Auflagen). The study programme is accredited with certain conditions as it reveals certain content and structural weaknesses or inconsistencies that may be corrected within a 12 month period. This, in fact, may be a high quality programme which needs improvement in some areas. In case of conditional accreditation the accreditation term is reduced. After the submission of documents testifying to the timely implementation of obligations and the confirmation of this fact by the Accreditation Commission the term is extended to the normal period. If the implementation of obligations has not been confirmed the accreditation is not extended.
- Rejection

## 1 General Information about the HEI

The Federal State Autonomous Educational Institution of Higher Education “Peter the Great Saint –Petersburg Polytechnic University” (hereinafter SPbPU) – is a multifunctional state higher educational institution. In 2010 it got a status of a national research university in recognition of its role and capacities in the field of education, as well as multidisciplinary research and development.

Among the Russian universities of technology, Saint Petersburg Polytechnic University has always been ranked among the leaders.

At the moment SPbPU includes 11 basic institutes, departments of Professional Training, branches in the cities of Cheboksary, Sosnoviy Bor, Cherepovets, a complex of research departments including the Joint Institute of Science and Technology, research and

educational centres, a number of specialized research and production structures, sports and recreation complex, vacation camps.

The University trains:

- Bachelors and Masters of Science within 49 training directions in science and technology;
- Specialists (engineers, economists, managers) within 9 training directions;
- Candidates of Sciences and Doctors of Sciences in 92 scientific training directions.

Forms of studies: full-time education; part-time (evening studies); correspondence course

SPbPU provides an opportunity to get postgraduate education – doctoral degree, second higher education, retraining in the future-oriented training directions.

Students’ cohort:

- 15807 people –full-time education,
- 4200 people - part-time (evening studies),
- 4160 people – correspondence course,
- 1100 people–professional trainings programs (second higher education, professional development, etc.).

SPbPU has concluded 340 cooperation agreements with 253 Universities from 47 countries all over the world. Out of this number 58 Universities are listed in the Top-500 in QS World University Rankings.

In 2014 64 cooperation agreements with foreign Universities were signed , out of which 15 new agreements are concluded with the Universities listed in the QS 100-500 rating; also 7 agreements were signed on student mobility.

In 2014 SpbPU, being one of the leading Universities-participants in the Programme «5-100-2020» , on suggestion of the Ministry of Education, has become a partner in the implementation of the project on the development and implementation of development programmes of Slavonic Universities.

The development of strategic partnership with foreign Universities has become a key component of inter-institutional cooperation.

The material and technical resources of SpbPU comprise : 18 teaching and laboratory buildings, 17 buildings of engineering infrastructure, 29 architectural monuments, 5 social infrastructure facilities, 15 dormitories, 7 residence buildings and 98 other objects (including workshops, boxes, garages and other facilities) with general area of 480 000 square meters, out of which 262789, 9 m<sup>2</sup> are classrooms and laboratories. Altogether there are 350 rooms equipped for studies, practical and research work. Laboratory facilities provide for quality delivery of all educational programmes and research work of undergraduate and post graduate students and staff.

At the university, 11 institutions and 105 departments are involved in both education and research: the Institute of Civil Engineering (ICE); the Institute of Power Engineering and Transportation (IPET); the Institute of Metallurgy, Mechanical Engineering and Transport (IMMET); the Institute of Physics, Nanotechnology and Telecommunications (IPNT); the Institute of Computing and Control (ICC); the Institute of Applied Mathematics and Mechanics (IAMM); the Institute of Industrial Economics and Management (IEM); the Institute of Humanities (IH); the Institute of Military Engineering and Safety Research (IMESR); the Institute of International Educational Programs (IIEP); the Institute of Physical Training, Sport and Tourism (IPTST).

Three branches also provide education and training. These are the Cheboksary Institute of Economics and Management (Branch) of FSAEI HE "SPbPU", the Institute of Management and Information Technology (Branch) of FSAEI HE "SPbPU" in Cherepovets, the Nuclear Energy Institute (Branch) of FSAEI HE "SPbPU" in Sosnovy Bor.

As of December 2014 the united library stock of the University comprise 2 978 097 storage items. During the reporting period 31 137 documents in the amount of 9 812 691, 30 rub. have come in from various sources and which have been entered on library's books and records. Of which the book stock – 24 792 items. (6 510 titles), periodicals – 6 342 items (598 titles to include 13 – foreign). A considerable part of foreign electronic information resources have been supplied by

the non-profit partnership “National electronic and information consortium” and the Russian Foundation for Fundamental Research as SPbPU is a participant of the Federal target programmes.

One of the largest student trade union organizations in St. Petersburg founded in 1965 is active in the University. Today the organization includes of 13000 full time students of SPbPU.

The Master’s study programme «Processing Technologies of Materials» («Metallurgy») is well-integrated in the HEI’s strategy. The goals and qualifications of the programme are well defined and sound. The students’ competencies correspond to the target Master level. The programme under accreditation is in compliance with the mission and development strategy of the University.

## 2 Description of the double degree programme

The double degree Master programme «Processing Technologies of Materials» (“Metallurgy”) was launched in 2011 together with the Brandenburg University of Technology (hereinafter BUT) with the goal of training specialists in the field of Metallurgy with the knowledge of two languages - Russian and German, for employment at Russian-German technological companies and for research within the framework of international Russian-German projects. The programme was developed under the agreement on cooperation between the Universities signed in 2009.

The ideology of the joint programme is the study of metallurgical technologies with the account of specific features of manufacturing companies of both countries: Russia and Germany. The programme’s graduates are expected not only to have a good command of a foreign language but also be familiar with specific features of industrial enterprises in Russia and Germany. Apart from studying major subjects and language practice students are made familiar with the different mentalities of the two states, which opens up good opportunities for developing a successful career in international companies or participation in international research programmes.

A brief description of the study programme «Processing Technologies of Materials» (22.04.02\_08) within the profile «Metallurgy» (M.Sc.), delivered by the Federal State Autonomous Educational Institution of higher Education “Peter the Great Saint –Petersburg Polytechnic University is presented in the table below:

SECTION I	
Double degree study programme	«Materials processing technology (international program in a foreign language)»(22.04.02_08)
Level of education / Duration of training	Master’s degree program / 2 years
Subdivision (Head of Department )	Institute of Metallurgy, mechanical engineering and transport (Doctor of Engineering, professor Anatoly Anatolievich Popovich)
Graduate departments (Heads of graduate departments)	Department of Material Science and Technology (Dr of Engineering, professor, Valery Nikolayevich Tsemenko) Academic adviser of the program

	Dr. of Engineering, Gleb Andreevich Turichin
Date of review	20-22 October, 2015
Person in charge of accreditation	Prof. Dmitry Germanovich Arseniev, Vice-Rector for International Affairs
SECTION II	
Number of ECTS /Credits	120
Terms (number of semesters) and form of education	years (4 semesters), full-time education
Beginning of training (winter / summer semester)	Winter semester
Date of the beginning of the program implementation	September 2011
Previous accreditation (date, duration of the accreditation, accreditation agency)	State accreditation No 0733 dated 03 July 2013 until 11 March 2019 (In Russia it is programme accreditation)
Target group	Applicants can be Bachelors graduated from specialties "Metallurgy" and "Material Science and Technologies of New Materials", who are interested in international research or in working for joint Russian-German technology companies
Prerequisites for the admission to training	Bachelor's degree in training direction "Metallurgy", high GPA, second-language skills
Opportunities for further education (after completion of the study program)	Education in the post-graduate training program
Number of places	Up to 5 places with DAAD scholarship, altogether up to 12 places
Tuition fee	Free of charge
Employment, potential areas of professional activity	International industrial orientation of the program makes it possible for its graduates to obtain real opportunities for further employment in Russian-German technical companies

A graduate of the programme is expected to obtain the following *general cultural competences*:

- to raise one's intellectual and cultural level; to show initiative; to take responsibility; to have good command of Russian and foreign languages and use them for the purposes of business communication; to set goals and objectives for research; to keep current with new research methodologies, to change, if necessary, research and industrial profile of one's professional activity; to independently acquire new knowledge and skills, including the knowledge in the spheres, which are not directly related to one's sphere of activity; to use data bases, software packages and computer graphic design means for solving professional tasks; to use fundamental engineering knowledge in professional activity; to understand, explicate and use in practical activities the basics of labour legislation and legal norms; to have the skills of formulating and arguing one's own statements and research positions; to analyse and make conclusions on social, ethic, research and technical issues in one's professional activity.

A graduate of the programme is expected to obtain the *following professional competences*: to be able to use innovative methods of solution of engineering problem; to be able to use the

principles of quality management and to utilize a process approach in order to identify areas for improvement; to be able to use the main principles of sustainable use of natural resources and environment protection; to be able to perform marketing research; to be able to develop technical and economic justification of innovative solutions in professional activity; to be able to develop scientific and technical documentation, to write research and technical reports, reviews, publications on the results of research; to be able to carry out expert evaluation of processes, materials, and trial methods;

According to the types of activity:

- Engineering and manufacturing: to be able to control real technological processes of metal production and processing; to be able to conduct analysis of technological processes in order to choose ways, measures and means of production quality management; to be able to analyze the full technological cycle of material production and processing; to be able to prognosticate the operating capability of materials in different conditions of their operational use; to be able to formulate proposals on enhancing technological processes and equipment;
- Organization and management: to be able to manage projects; to be able to justify the goal, necessity and a possible way of financing the development and utilizing materials and production technologies; to be able to make an economic analysis of costs and effectiveness of technological processes; to be able to use main concepts and categories of production management and organization management systems; to be able to work out suggestions on the enhancement of effectiveness of resources use;
- research: to be able to develop models for describing and predicting phenomena on the basis of a systemic approach, to conduct their quantitative and qualitative analysis with the assessment of applicability of the obtained results; to be able to plan and carry out analytical, simulation and experimental research; to critically evaluate data and make conclusions; to be able to select methods and conduct trials for assessing physical, mechanical and working properties of materials; to be able to analyze main laws of phase equilibrium and kinetics of transformation in multi-component systems;
- project: to be able to apply engineering knowledge for developing and implementing projects which satisfy assigned requirements; to be able to apply design methodology; to be able to use automated design systems; to be able to draw up design briefs for non-standard equipment, engineering facilities and process automation facilities.

At the end of studies a graduate is expected:

- to know: a foreign language; philosophical aspects of science and technology, choice between a human and a robot, basic knowledge of innovation technologies in metallurgy and of the ways of managing innovation development; study of methods for planning experimental work and analysis of obtained results; mastering different methods of conducting research; principles of production quality management;
- to be able to do: to carry on a general dialogue in a foreign language; to read foreign literature for professional purposes without a dictionary; to translate with the help of a dictionary specialized literature;
- to possess: ways and methods of business communication in the professional sphere; techniques of team work.

## **2.1 Achievements of the study programme**

### 2.1.1 Provision of up-to day content of education

Practically all disciplines of the study programme are based on the results of research of the University departments. When writing a Master's dissertation the students of the programme are involved in real-life research.

### 2.1.2 Research work

The departments engaged in the academic process have a lot of experience in research into up-to-date topics relevant for modern industry. The results of research work of the teachers are published in scientific journals registered in the databases Scopus and Web of Science. The information on the research conducted by the staff can be found at the web sites of the laboratories and departments: <http://tmslab.spbstu.ru/category/news/>  
<http://www.tu-cottbus.de/einrichtungen/de/pantarhei/projekte/aktuell.html>  
<http://www.mmf.spbstu.ru/kafedry/tim/search.html>

### 2.1.3 Employability of graduates

The major part of graduates enter a postgraduate programme either in BUT or in SPbPU. After the "Framework agreement regarding a Joint Doctorate between Brandenburg University of Technology Cottbus-Senftenberg and Peter the Great Saint-Petersburg Polytechnic University" was signed the students have a possibility to enter the Joint Doctorate programme upon completion of the Double Degree Master's programme.

During their studies on the Master's programme and post-graduate programme students have an opportunity to be employed at the Laboratory of Lightweight Materials and Designs of SPbPU under the supervision of one of the leading scientists in this area.

## **2.2 Academic mobility of students**

The duration of the programme is 2 years (4 semesters). The major part of the educational work load falls on the first year because the second year is spent at the guest institution. In the second year, the students do two selective modules and write a research paper in the third semester; the fourth semester is devoted to research work and writing a dissertation. After the defence of the Master's dissertation in the host institution and getting a Diploma of the host institution the student returns to the home institution, translates his/her dissertation into Russian and defends it in front of a specially established State Examination Board, after which he/she is awarded a Diploma of the home institution. The preparation of a dissertation and final attestation takes up to 17 weeks, that is, the whole of spring semester of the second year.

### **III Description and evaluation**

The Peer Group is especially appreciative of the possibility of meeting and interviewing a representative from the University of Cottbus. This interview with the representative of the second partner University made it possible to better understand the concept of the study programme for both sides of the process, the module principle of the programme and several other applied aspects. The practical importance and necessity of such meetings when accrediting double degree study programmes cannot be overestimated.

As a result of the site visit and analysis of written evidence the Peer Group arrived at the following conclusions about the programme «Processing Technologies of Materials» («Metallurgy») (M.Sc.).

#### **1 The goals of the study programme «Processing Technologies of Materials» (“Metallurgy”) (M.Sc.)**

##### **1.1 Introduction**

The goal of the study programme «Processing Technologies of Materials» (“Metallurgy”) is training specialists in the field of Metallurgy with the knowledge of two languages, Russian and German, for employment at Russian-German technological companies and for research within the framework of international Russian-German projects. The programme was launched in 2011 together with the Brandenburg University of Technology under the agreement on cooperation between the Universities signed in 2009.

The detailed information about the programme can be found at the websites of both Universities in Russian, German and English and accessible to all interested persons from all over the world.

The main objective of the programme was identified as education and training of a small group, 12 Master’s students maximum, in the field of processing technologies of materials for international labour market, especially in the sphere of German-Russian cooperation. The programme is oriented towards employment of graduates in industry, participation in research, and practical work in the leading German and Russian companies. That is why the programme is positioned as a double degree programme delivered at Peter the Great Saint–Petersburg Polytechnic University (Russia) and Brandenburg University of Technology, Cottbus-Senftenberg (Germany).

The Peer Group arrived at a unanimous conclusion that the goal of training highly qualified professionals is fully achieved. In spite of certain difficulties, in the delivery of this programme both HEIs managed to impressively combine the Russian and German systems of higher education. Master students acquire cross-cultural competences which are so important for the system of higher education.

Unfortunately, the experts have to acknowledge the fact that the allotted small number of 12 Master students for the programme has not been reached. It has also been found that there are certain drawbacks both in the development and delivery of the study programme. For example, some of the employers present at the interview during the site visit did not know about the existence of such a programme. The experts also noticed that the students, in spite of their effort, still have a substantial language barrier. Furthermore, the funding of the double degree programme (specifically, the funding for student mobility) is not assured. The cessation of DAAD's funding and the absence of alternative financial sources pose a serious risk for the existence of the study programme.

The Peer Group observed the small number of students on the programme and mentioned the fact that though the programme's graduates were highly qualified specialists, they are employed exclusively in HEIs or/and involved in research, and thus, are not engaged in industry at this stage.

## 1.2 Qualification goals of the Master's study programme

The goal of the double degree Master's programme «Processing Technologies of Materials» («Metallurgy») is training of highly qualified specialists in the sphere of processing technologies of materials, who have broad knowledge and practical skills in the analysis of technological processes of production and processing of materials and prognosticating the operating capability of materials in different conditions of their operational use.

Graduates of this study programme are expected:

- to know: a foreign language; philosophical aspects of science and technology, choice between a human and a robot, basic knowledge of innovation technologies in metallurgy and of the ways of managing innovation development; study of methods for planning experimental work and analysis of obtained results; mastering different methods of conducting research; principles of production quality management;
- to be able to do: to carry on a general dialogue in a foreign language; to read foreign literature for professional purposes without a dictionary; to translate with the help of a dictionary specialized literature;
- to possess: ways and methods of business communication in the professional sphere; techniques of team work.

## 1.3 Conclusions

The Peer Group is of the opinion that:

1. The Master's study programme «Processing Technologies of Materials» («Metallurgy») is well integrated in the HEI's strategy. The goals and qualifications of the study programme

are clearly defined and convincing. The learners' competencies correspond to the target Master level. The key competences are acquired. The programme under accreditation complies with the mission and development strategy of the University.

2. The cessation of DAAD's funding and the absence of alternative financial sources pose a serious risk for the existence of the study programme.
3. Exchange second year students from Germany, who are graduating in the summer of 2016, are an excellent distinctive feature of the programme. After this event a sound opinion about the programme will be formed.
4. The programme's graduates, being highly qualified specialists, are employed exclusively in HEIs or/and involved in research, and thus, are not engaged in industry at this stage.

#### **1.4 Recommendations of the Peer Group:**

1. In order to enhance the effectiveness of the academic process it is recommended to increase the number of students to the target admission quota of 12 people. It is also advisable to involve more students from Germany in the education process.
2. The University should seek additional sources of funding student mobility periods in Germany.
3. The University and the graduate Department in cooperation with employers should be making an effort to promote the employment of the programme's graduates at industrial enterprises.

## 2 Concept

The fundamental concept of the double degree study programme «Processing Technologies of Materials» («Metallurgy») consists in training qualified specialists in the sphere of Metallurgy. The implementation of the programme will make it possible to acquire broad basic knowledge and practical skills in the analysis of technological processes of production and processing of materials and prognosticating the operating capability of materials in different conditions of their operational use.

As far as the concept of the study programme is concerned, the Peer Group found that there is a discrepancy between the presentation of the programme in the documents and its implementation.

The international experts divided on the point of congruence of the programme with the information presented in the self-evaluation report. While some of the international experts consider that the program has been described comprehensibly another part of the reviewers consider the written self-evaluation chaotic and difficult to understand. Furthermore, they claim that this documentation does not reflect the reality. Obviously, there are cultural differences in the evaluation of written documents. One of the possible reasons for these inaccuracies could be frequent changes in the regulations issued by authorities (for example, the RF Ministry of Education and Science).

The basis of the studies at the SPbPU is not the documentation being submitted for evaluation to the international experts, but an informal concept in the minds of people involved in the program. The experts, who expected an exact representation of the lived concept in the written documents, consider the transparency of studies towards outsiders and freshmen as not given. Throughout their studies, students arrange with the existing circumstances and get along very well.

However, during their studies at the Master's degree level the students acquire the programme to the full extent.

The members of the Peer Group are unanimous in their opinion that the concept of the programme delivered by Peter the Great Saint-Petersburg Polytechnic University is excellent and doesn't have to be changed in its main aspects.

As for professional education, it received a positive evaluation by all the experts. Especially noteworthy is the fact that the students start working on their Master's dissertation from the very start of the programme. The experts pointed out the fact that students have an opportunity to choose subjects at the German partner-institution.

In practical classes in the laboratories of SPbPU the students acquire the knowledge and methodology necessary for writing their Master's dissertation at the University of Cottbus.

The Peer Group commended the students' high level of theoretical knowledge. However, it was not clear to the experts how this knowledge had been acquired. The experts were not able to find this information in the written documents or to clarify it in the interviews with the persons responsible for the delivery of the programme

A weakness of the programme's concept, including the programme of the partner institution is lack of synchronization of the study programmes (for example, different dates of semesters' beginning in Russia and Germany). Easing of some administrative regulations in this respect could be very useful. Secondly, because of the insufficient number of students in a group it's hard to organize a dynamic working interaction between students in groups.

## **2.1 Admission requirements**

Admission requirements are regulated by the normative documents on education in the Russian Federation, RF Ministry of Education and Science, and by the admission regulations and requirements for entrance examinations of the University.

The present programme is developed in the profile of "Metallurgy", that is why eligible candidates for admission are Bachelor or Master Degree holders in "Metallurgy". All applicants have to achieve level DSH-2 in German upon completion of the first year of the programme. The programme of the first year is taught in Russian at the home institution, and the second year subjects are taught in the foreign language (German or Russian) at the host institution.

### 2.1.1 Selection criteria on the basis of competition

In case of insufficient number of places in the programme students are selected according to the following criteria:

- grade point average in the Diploma of Bachelor (Specialist or Master);
- knowledge of German;
- opinion of the teaching staff about the candidate (interview with a programme coordinator).

### 2.1.2 Provision of adequate conditions of study for special needs students and students in difficult life situations

The Peer Group analyzed the admission rules and requirements established by the University and found that additional necessary requirements are met to accommodate different categories of applicants with special needs depending on their disabilities.

Special free language courses are organized for foreign students, first year students and students of SPbPU's other programmes.

### 2.1.3 In addition to Master's programmes:

In June of this year, the BUT and the SPbPU signed an agreement on establishment of a joint postgraduate program. The double-degree Programme's graduates are able to apply for admission to the joint postgraduate training program and upon its successful completion be awarded Candidate of Sciences (Engineering) diploma of the Russian and the German standard. Postgraduate students under the programme will be actively involved in joint research projects, building new competencies. Besides the postgraduate programme, SPbPU applied for establishing a laboratory under the supervision of the leading researcher V.Mikhailov, head of the programme under accreditation from the BUT.

The Ministry of Education and Science of the Russian Federation supported the application. Last year, the Laboratory of Lightweight Materials and Designs was established. The graduates of the programme under accreditation can be hired at the Laboratory as soon as they start their work on their Master's dissertation. Currently there are 5 participants in the programme.

## **2.2 Structure of study programmes**

The programme takes up 2 years and is divided into four semesters. The students are expected to get at least 60 credits a year. The first and the third semester begin on September 1 and end in late January. The second and the fourth semester start in mid-February and end in late June. In December/January and May/June, the programme's students have tests and exams. The students have their winter holidays in the first week of February and summer holidays in July/August.

The main modules take up 2 semesters, during which students add to their knowledge in science, as well as skills to apply theoretical knowledge to the analysis of processes. The main learning workload of the programme falls on the first year of studies as the second year of studies is spent at the host university. The second year of studies includes two sets of elective courses and the Master's research in the third semester, as well as work on the dissertation and the Master's research in the fourth semester.

After the defense of the Master's dissertation in the host institution in the German language and getting a Diploma of the host institution the student returns to the home institution, translates his/her dissertation into Russian and defends it in front of a specially established State Examination Board, after which he/she is awarded a Diploma of the home institution. The preparation of the dissertation and final attestation takes up to 17 weeks, that is, the whole of spring semester of the second year.

The graduates are expected to show that they have a high level of knowledge at the state examination - the final attestation which is held in June of the second year of studies, and then

they have to successfully defend their dissertation at a public defense before the State Examination Board.

### **2.3 Modularization and workload**

The programme includes two mandatory modules of general science: Humanities (6 credits) and Economics (7 credits). The programme also includes five profession-specific compulsory modules: Casting Technology (5 credits), Materials Science (7 credits), Structure and Property Management (4 credits), Materials Testing (5 credits) and Simulation and Optimization (7 credits). Besides modules of general science and profession-specific ones, the programme includes three modules of elective courses, 6 credits each. In the first, the second and the third semesters of the programme, the students are engaged in research (6.5, 2.5, and 16.5 credits, respectively), while in the second and the fourth semesters, the students have their research practice (4.5 and 11 credits respectively). 20 credits are allocated to the work on and a defense of a Master's dissertation.

Upon completion of necessary modules/courses, a student receives 120 credits. Credits can only be given on successful completion of a required assignment and an appropriate grade for achieved learning outcomes.

The credit for study programmes developed in accordance with the Federal State Educational Standards includes 36 teaching hours (a teaching hour is 45 minutes long) or 27 clock hours.

Core modules provide a comprehensive training to students, as they are not only focused on learning the fundamentals, but also skills development at skills building sessions and laboratory practicum, as well as research guided by a research supervisor. Profession-specific compulsory modules and modules of elective courses include the following academic areas: foreign language, Materials Science, Casting Technology, Metal Forming, Welding Technology.

### **2.4 Learning context**

The Master's study programme utilizes different forms of teaching and learning, which support and complement each other: lectures, skills building sessions and laboratory work, workshops, self-study and research. These learning activities ensure that students are provided with theoretical knowledge, practical and research skills.

Up-to-date hardware and software is applied, e.g. students take a test in the German language with the help of on-line testing system OnDaF test to evaluate the level of knowledge prior to taking an intensive course of German in Germany.

Education and training is provided in two languages: for the Russian students, the first year is in Russian, while the second year is in German; for the German students, the first year is in German, while the second year is in Russian.

The requirements to the graduation paper are disclosed in the Regulations on the academic performance control, the state final attestation and Regulations on Master programmes. The students of the programme prepare and defend the graduation paper in the host institution in the foreign language. They do this work during one semester. After that the students come back home, translate the work into their native language and defend the work in their home institution. They are allocated 1-2 months to do this. The theme of the work is determined by the research supervisor (from the home and the host Universities) together with the student during the first three semesters.

## 2.5 Conclusion

The study programme is well thought through conceptually and is successfully implemented in the education process. The concept of the programme makes it possible to successfully achieve both specific qualification objectives and general goals. The education content on the whole is fit for purpose and enables students to work in HEIs and research centers after graduation. Different forms of learning promote harmonious development of personal qualities of learners, such as ability to work in a team, presentation and leadership, analytical thinking, and so on.

The curriculum and the syllabus of the study programme are modified and updated every year including the enhancement of foreign language teaching. Among other things, the Peer Group would like to emphasize a strong feature of the programme's concept: - the topics of Master's dissertations for Russian students in Germany are chosen on suggestions from German industrial companies and are financed (fully or partly) by them.

In the Peer Group's opinion, it is also necessary to indicate the weaknesses in the programme concept of both partner institutions, namely:

- Lack of synchronization of the study programmes (for example, different dates of semesters' beginning in Russia and Germany);
- Insufficient number of students in a group makes it hard to organize a dynamic working interaction between students in groups. The low number of students on the programme has led to the situation that the programme's graduates are employed exclusively in HEIs or/and involved in research, and thus, are not available to industry as qualified specialists;
- It is necessary to point out that the curriculum of the study programme should reflect the real state of things. It is recommended to present it in a condensed form which could be easy to comprehend. The elective courses should be highlighted in the current curriculum.

The Module catalogue (summaries of all modules including work placement and Master's research paper) should be presented in a form which contains the main elements of the module's description. The summary of a module should contain the module title; the name of a person responsible for the module; subject scope; objectives (learning objectives and competencies); module disciplines; the number of ECTS credits; credit distribution for lectures, seminars and practical classes, and information about learning outcomes of the module.

- All documentation relating to the study programme should be accessible and transparent.

## **2.6 Recommendations of the Peer Group:**

1. It is recommended to take advantage of mass media and Internet resources to publicize the programme under accreditation and to place comprehensive information about the programme on the University web site.
2. The contents of the modules should be made more structured, compact and accessible to students.
3. It is advisable to synchronize the curricula of the partner-institutions.

### **3 Implementation**

#### **3.1 Resources**

##### 3.1.1 Material resources and classroom facilities

In the opinion of the Peer Group the material resources are sufficient for the current number of students.

SPbPU has all the necessary facilities for quality teaching, including learning and support areas, as well as adequate infrastructure, including dormitories, gymnasiums, university administration offices, the Students' Club, the Fundamental Library, the Reading Room, the White (Assembly) Hall for 600 seats, the Conference Hall, resource centres, the Museum Complex, the Expo Centre and other auxiliary facilities. Rooms are equipped with all the necessary devices, furniture and equipment to provide teaching at a high level and create high-quality social and living conditions for students, teachers and other university staff.

Physical facilities of SPbPU include 18 buildings for teaching and laboratory work, 17 engineering infrastructure facilities, 29 heritage assets, 5 social infrastructure objects, 15 dormitories, 7 residential buildings and 98 objects of other types (including production facilities, boxes, warehouses, garages and other structures) with the total area of over 480,000 square meters, of which 262,789.9 square meters are for teaching and laboratory activities with classrooms, including large lecture halls, classrooms for skills building and laboratory sessions. In total, at the university, there are 350 laboratories equipped for learning and research.

The equipment of university laboratories gives students, postgraduate students and teachers an opportunity to implement all the licensed study programs and do research.

The Departments of both Universities involved in the double degree programme are fit with modern innovative equipment. Research laboratories are established on the basis of both Departments.

The Peer Group had an opportunity to visit some lecture rooms, which were found in compliance with the established standards. There is also laboratory equipment adequate for the purposes of the programme. However, the pieces of equipment in the laboratories are installed very close to each other, which might impact on the work effectiveness. The Peer Group was also informed by the coordinators that a new research facility was built. It occupies a separate building with the area of 2400 square meters, and some of the laboratories are already being moved there. The Peer Group had an opportunity to visit this facility and see the modern equipment and installations, specifically, the state-of-the-art welding equipment.

A lot of work has been done at the University in order to renovate and update the material and technical resources. 361million rubles was spent on general and current repairs and maintenance of buildings and constructions. Immovable property objects are kept in a good condition; the classrooms are supplied with modern teaching aids and other equipment necessary for education and research. The University has established a program to develop its assets for at the period until 2020, including multi-faceted re-equipment of academic buildings to achieve the accessible learning environment for persons with reduced mobility in compliance with legislation.

The University has up-to-date teaching aids: over 215 computer rooms have the Internet access. To ensure work with various internal and external resources, the University has a fleet of powerful servers, a wireless network (Wi-Fi) was established, Wi-Fi access points are located on all the floors of the most academic buildings and in the Reading Room of the Fundamental Library. Such a solution meets today's requirements to ensure an uninterrupted students' access to learning resources of the LAN and the Internet. There is a computer network at all students' dormitories.

A few multimedia centres have been recently opened. The classrooms are equipped with projectors, screens, electronic interactive whiteboards and other multimedia systems.

### 3.1.2 Human resources

The number of full-time teachers involved in the delivery of the joint programme is sufficient for its successful implementation. The Division of Technology in Metallurgy, the IMMET, headed by Doctor of Sciences (Engineering), prof. A.A. Popovich, is an advanced unit within the University structure in the area of education quality enhancement. The total number of full-time teachers involved in the programme is 12 people, including 7 Doctors of Sciences and 5 Candidates of Sciences. International experts are also active participants in the teaching process. There are over 30 full-time positions of administrative, technical and support staff at the Division.

During the interviews with the teaching staff the experts found that most teachers are fluent in foreign languages and have experience of working at foreign HEIs, which testifies to a high academic mobility level of this study programme.

The Peer Group emphasized professionalism of the teaching staff involved in the delivery of the study programme "Processing Technologies of Materials".

Among the most prominent teachers are:

- Doctor of Engineering, the Director of research and technological complex “Laser and Welding Technologies”, Director of the Russian-German Centre of Laser Technologies, member of Dissertational Boards, Holder of the RF Government award in the sphere of education for research.
- Doctor of Engineering, Professor, specialist in the field of thermo mechanical treatment of metal materials, physico-technological fundamentals of non-isothermal thermo mechanical treatment, organizer of the traditional since 1993 international conferences on new technologies in material science, plastic, thermal and strengthening treatment of materials, parts, and tools. Member of the Association of Metallurgists of Russia, inventor of the USSR, prize winner of the N.A. Minkevich all-USSR competition “For the best work in development of new resource saving technologies and equipment for thermal and thermo chemical treatment”.
- Doctor of Engineering, Professor, honored worker of science and technology of the Russian Federation; academician of the International Academy of Ecology, Human Safety and Environment Sciences; Vice-president for research work of the scientific enterprise “Association of St. Petersburg Casters”.
- Doctor of Engineering, Professor, author of 9 patents and author’s certificates.
- Doctor of Engineering, Professor, a visiting scientist in Korean Institute of Material Science and Mechanical Engineering, Changwon, South Korea. The field of research interests includes metal powder industry, composite materials, non-equilibrium and nano-patterned metal systems, their production, properties. Author of more than 90 papers published in peer-reviewed journals, member of the organizing committees of four international research and technical conferences, member of two dissertation councils.
- Doctor of Engineering, Professor, former vice- rector of St. Petersburg Institute of Mechanical Engineering, winner of the Russian Federation President’s Prize in the field of education for year 2002.
- Doctor of Engineering, Professor, specialist in the theory of plastic deformation of powder and porous media, development of technologies for producing various items from powder and porous materials on the basis of rational combination of processes of their compactions and deformation. Has more than 130 publications.
- Doctor of Engineering, Professor, head of the Lightweight Materials and Structures Laboratory of SPbPU, director of the Research Centre of Lightweight Materials, head of the department of connection and welding technologies of Brandenburg University of Technology (BTU), Scientist-counselor of the Federal Ministry of Education on the Innovative

program 2020, Expert-reviewer of the German and Bavarian Society of Researchers Foundation, Expert reviewer of Alexander von Humboldt Foundation.

- Candidate of Technical Sciences, associate professor specializing in rheologic properties of nano-structured materials, physical and mathematical modeling of metals, a grant winner of St. Petersburg Government; the author of over 25 publications;
- Candidate of Technical Sciences, associate professor the RF President grant winner of 2012 and 2014 specializing in the research into automobile and high-strength tube steels, and metal processing.
- Candidate of Technical Sciences, the RF Ministry of Education grant winner of 2012 for the theme “Research and mathematical modelling of the structure formation and fracture mechanism of high-purity nano-crystal beryllium in plastic deformation and thermal processing”, the RF President grant winner of 2015.
- Candidate of Technical Sciences, associate professor, the Head of LLC «Plazmocenter”, organizer of annual international practice and research conferences «Technologies of repair, restoration and strengthening of machine parts, instruments and technological equipment”.

### **3.2 Organization and Decision-making processes**

#### **3.2.1 Organization**

Decisions regarding introducing and improving study programmes are taken at the Institute and University, Academic Council and the Rector’s level.

The IMMET Directorate organizes the teaching process; the Directorate employees develop a timetable, monitor students’ performance, maintain students’ personal files and schedule exams. The Program’s Coordinator and Research Advisor are appointed by the Rector’s order.

#### **3.2.2 Participation of students in decision-making**

Students choose a leader per formal group of students, who is in charge of a monthly attestation of students and their contacts with the teachers. When the Programme was being developed, students' opinions were not taken into account. But in future it is planned to involve students in the process of developing and updating study programmes.

### **3.3 Cooperation**

In June of this year, the BUT and the SPbPU signed an agreement on establishment of a joint postgraduate program. The double-degree Programme’s graduates are able to apply for admission to the joint postgraduate training program and upon its successful completion be

awarded Candidate of Sciences (Engineering) diploma of the Russian and the German standard. Postgraduate students under the Programme will be actively involved in joint research projects, building new competencies. Besides the postgraduate programme, SPbPU applied for establishing a laboratory under the supervision of the leading researcher V.Mikhailov, head of the programme under accreditation from the BUT.

The Ministry of Education and Science of the Russian Federation supported the application. Last year, a laboratory of lightweight materials and designs was established. The graduates of the Programme under accreditation can be hired at the lab as soon as they start their work on their Master's dissertation. Currently there are 5 participants in the programme.

In July 2015 the winners of ERANET.RUS competition were announced. The joint application of SPbPU and BUT was supported.

The cooperation agreement on the Double Degree study programme between SPbPU and BUT Cottbus should be renewed.

### **3.4 Assessment system**

#### **3.4.1 Selection of the assessment forms and their relevance for reaching the intended learning outcomes in each module**

Within each course, there is a defined list of individual and group assignments. These assignments are a mandatory course requirement and at the same time it is a variety of formative assessment of acquired knowledge and skills monitoring. The results of these assignments are taken into account in the summative assessment of students in the relevant discipline.

#### **3.4.2 Diversity of assessment forms**

Knowledge, skills and abilities of a student are rated with "excellent", "good", "satisfactory", "unsatisfactory", "passed" and "failed" grades.

The type of assessment (exam, pass/fail exam) depends on the curriculum. Some courses, types of traineeship and course papers take the form of a pass/fail exam or an examination with a differentiated grade ("excellent", "good", "satisfactory", "unsatisfactory").

On the Director's permission, high performing students may take exams in other courses, taught at the University, but not included in the curriculum of such students' specialty (profile). Based on the student's individual application, the results from such assessment will be included in an exam record, a gradebook and a diploma supplement.

### 3.4.3 Correspondence to the module, focus on assessment of the knowledge and competences

Course exams and pass/fail exams are held in accordance with the approved curriculum.

### 3.4.4 Frequency and organization of examinations and other assessment procedures

The academic year schedule depends on the profile, the type of delivery and the year. Exams are taken during examination session according to the schedule approved by the Vice Rector for Academic Affairs.

If the working plan schedules that theoretical and practical courses end prior to the examination period, examinations and pass/fail examinations for such courses may be held during the term. To do this, all the necessary conditions to take examinations have to be provided. The outcomes of such exams are summarized at the end of the examination period together with all the other completed courses.

### 3.4.5 Provision of special rules and assessment requirements of knowledge/competencies for disabled students, and students in difficult life situations

Within the overall period of studies, students with a permission to have an individual learning path and schedule may take examinations between examination periods under the terms established by the Dean of a faculty.

Examination and pass/fail examination procedures are to ensure opportunities for real knowledge and skill assessment in accordance with the working program of a course.

In certain cases (long-term illness, difficult family circumstances), a student is provided with an academic leave of absence, no longer than 1 year long.

### 3.4.6 Responsibility of students for violating of examination and assessment procedures

Non-attendance of an exam without a good reason at the appointed time is considered as a used attempt to take the exam and is equal to being graded as "unsatisfactory".

Temporary inability confirmed with a certificate of a medical institution is recognized as a good reason. The certificate is to be issued by student clinic No. 76 and handed by the student to the dean's office.

Cheating at an examination (use of reference literature or reference notes, learning materials, computers, electronic notepads without the teacher's authorization, as well as the use of means of communication) brings about removal of the student from the exam (academic assessment) and the "unsatisfactory" ("failed") mark is given.

### 3.4.7 Procedure of expelling students for academic failure

Upon the recommendation of the Dean of the Faculty following students can be expelled for academic failure:

- those who failed examinations and academic assessment during the examination session in three or more disciplines;
- those who did not make up for the failed exams in the period determined by the Rector's order;
- those who did not complete the program of traineeship and obtained the unsatisfactory mark when presenting the traineeship report;
- those who obtained the unsatisfactory mark for the retaken exam in front of the attestation board;
- those who missed more than 50% of classes without a good reason;
- those who failed interim (semester) attestation in three or more disciplines.

Students are expelled for academic failure by the Director of the Institute after the issue is reviewed by a special committee on the expulsion of students.

### 3.4.8 Control

- The Academic Department is charged with the supervision over examination procedures in accordance with the present Regulations.
- The Vice-Rector for Academic Affairs is entrusted with general control over compliance with the procedures of the Regulations.
- Outcomes of examination sessions and proposals on improvement of the academic process at a faculty are brought up for discussion at the meetings of the Directorate and academic council of the faculty.

## **3.5 Transparency and Documentation**

A comprehensive set of such documents regulating the assessment of knowledge and competencies of applicants and students has been developed and approved by the University. It includes: details of study programmes, admission regulations and requirements to entrance examinations, admission criteria, details of the learning process, requirements to assessing a level of knowledge and competences of students. The documents are published and are available to

students. Rules to recognize degrees awarded by colleges abroad are set by the legislation of the Russian Federation.

### 3.5.1 Availability of certified assessment tools

An assessment toolkit for certification includes:

- List of competences to be developed by students upon mastering the study programme;
- Description of ranking scales, indicators and criteria to evaluate competences;
- Standard control assignments or other materials required to evaluate learning outcomes upon mastering the study programme;
- Guidelines that explain procedures to evaluate outcomes upon mastering the study programme.

### 3.5.2 Participation in independent assessment procedures of learning outcomes of the study programme (Federal Internet Exam in Higher Education, Federal Internet Bachelor Exam, etc.)

The "Federal Internet Exam in Higher Education (FEPO)" is an innovative project which is focused on external independent evaluation of students' learning outcomes against the FSES requirements. The project makes it possible to evaluate the students' academic achievements at various stages of their education and training against the new requirements set by the Federal State Educational Standards (214 subjects).

In 2015, SPbPU took an active part in the project, ensuring that all interested students had a chance to take this exam.

### 3.5.3 Access to the relevant documents of the study programme

Copies of all the major documents related to the study programme, such as the Cooperation Agreement on the double Degree Programme, its curriculum, orders, etc., are kept by the Program's Coordinator and accessible to students on request. However, the Peer Group points out that the validity term of some of the documents has expired.

### 3.5.4 Certifying documents

Upon successful completion of the programme (120 credits including the graduation paper) a student is awarded a Diploma of SPbPU with a supplement and a Diploma of the BUT Cottbus with supplements.

The supplements to the Master's Degree Diploma contain information about the student's performance (the Supplement to the Diploma of SPbPU, Certificate and Diploma Supplement of

BUT Cottbus) which contain the reference to the fact that it was a double degree study programme delivered jointly by SPbPU and BUT Cottbus.

The degree awarding is conducted in accordance with the regulations and requirements applicable on the territory of the countries of the partner institutions.

If the student has only completed the workload of one University, (s)he is only awarded one degree.

### 3.5.5 Availability of the support system and regular consultations (group and/or individual) for students

As required (about twice a year), the programme coordinators from both sides hold meetings with the programme's applicants to provide them with the information and answer their questions. Besides, the coordinators hold organizational meetings as required.

For all international programmes a research supervisor and a coordinator are appointed by the Rector's order. The coordinator is expected to be fluent in a foreign language (English, as a rule) for communication with students and coordination of the programme. All the students of the double degree programme have the coordinator's contact information (mobile and stationary phone numbers, e-mail) for communication on general and personal issues.

Students can look up the examination requirements and samples of examination papers. The information about upcoming conferences, curricula and relevant changes, presentations, and teaching materials and text books is available to all students. Besides, at the beginning of the studies students are made familiar with the course descriptions. The main contact person for the students of the programme is a teacher-curator who supports the students during their first year of studies. He/she advises students on the issues connected with their studies and life in the University.

For the school leavers who are planning to study at the University career guidance events and joint events with secondary schools are held. "Open doors" events are conducted several times a year.

## **3.6 Gender equality and equal opportunities**

### 3.6.1 Gender distribution

Since 2011 there have been 29 students on the Double Degree Programme. Among them there are 19 male students and 10 female students. It is 2 to 3 ratio, which is considered to be quite good for a Master's degree programme in "Metallurgy".

There are 34 teachers on the staff of the Department of "Materials Technology and Research" of the IMMET. There 13 professors, Doctors of Technical Sciences; one female, all the rest are male.

Other 21 teachers have the degree of Candidate of Technical Sciences, and hold positions of associate professor, senior teacher and assistant professor. Out of 21 people 6 are female, the rest are male. Among them 5 young specialists are below 35 years of age, two of which are women.

### 3.6.2 Benefits

There is a trade union of students in SPbPU. This is a voluntary organization with a monthly membership fees. The members of the trade union are eligible for social financial aid from the union's fund in case of an extraordinary life situation or financial difficulties. Besides, students can benefit from a one month voucher to the health and recreation centre, where students receive board and free medical care. Also, members of the trade union can get a subsidized voucher to the SPbPU's health and recreation camps during winter and summer vacations.

### 3.6.3 Scholarship

The quality of the programme is confirmed by DAAD's support. The foundation awards 10 scholarships 400 Euros a month each (5 scholarships for SPbPU and 5 scholarships for BUT).

## **3.7 Conclusions**

The study programme is conceptually well thought and is successfully implemented. The teacher –student ratio in the study programme is approximately 1:1, and in the opinion of the expert is a very high indicator.

Based on presented evidence and interviews with the staff it was found that most of the teachers have experience of visiting foreign educational institutions and working abroad.

The Master's dissertations reviewed by the Peer Group were found to be in compliance with international standards.

The site visit didn't present an opportunity to find out the correlation between the qualifications of the teachers and the courses taught by them.

The same can be said about the correlation between the academic schedule and curriculum.

During the interviews with students it was found out that teaching and methodological materials are available in the library and at the Department, both in electronic and paper form, nevertheless, during the site visit these materials were not presented for the evaluation to the Peer Group.

However, the experts didn't have any doubt regarding the high qualification of the teachers of the Department.

The Peer Group had an opportunity to visit some lecture rooms, which were found in compliance with the established standards. There is also laboratory equipment adequate for the purposes of

the programme. However, the pieces of equipment in the laboratories are installed very close to each other, which might impact on the work effectiveness. The Peer Group was also informed by the coordinators that a new research facility was built. It occupies a separate building with the area of 2400 square meters, and some of the laboratories are already being moved there. The Peer Group had an opportunity to visit this facility and see the modern equipment and installations, specifically, the state-of-the-art welding equipment.

The experts emphasized that in order to implement the concept of the programme it is very important to have close cooperation with partners. During the interviews with the representatives of professional community it came to the attention of the experts that there were no cooperation agreements in this area. This fact surprised the Peer Group as the representatives of labour market present at the meeting were very interested in the programme and its graduates. Besides the representatives of industry expressed the idea of helping finance the stay of exchange students in Germany. Besides, it was recommended to expand the cooperation with industrial companies by way of cooperation in preparing Master's dissertation. This idea should be implemented as from the beginning of the Master's programme the students start their work on research projects.

### **3.8 Recommendations of the Peer Group:**

1. It is recommended to extend the laboratory facilities to make more room for laboratory and research equipment, which will make the work of student groups more effective.
2. The University and the major Department should have a closer cooperation with industrial partner companies in order to enhance the academic process and funding of the study programme.

## **4 Quality Management**

The members of the Peer Group divided on the issue of constituent elements of a well-functioning quality management system and on the ways they should be put into practice. However the Peer Group acknowledges that the HEI on the whole and the Institute in particular have a number of quality assurance mechanisms in place, which are present in the module system: Students Management, Learning Process, Student Academic Progress Records and SP monitoring.

It was found that the Institute has very high admission requirements for the programme.

The experts also noted that a lot of examinations and tests are held for assessing the students' level of knowledge. Students have an opportunity to participate in Olympiads and competitions, thus they are able to compare their knowledge with the knowledge of students from other Universities.

Some other experts pointed out to the fact that the existing quality management system does not contain a closed loop, which would lead to a continuous enhancement of education quality.

#### **4.1 Organization and mechanisms for quality assurance**

In the study programme management the information systems are used which focus on the support to the learning process. The main goal is to create the information and communication environment of the University that makes it possible to provide final users with transparent computing, communication and information services in required volumes and with the set quality indicators. In order to reach these goals the following tasks should be accomplished: to increase the accessibility of IT resources making them available from mobile devices; to improve computing capacities of supercomputer systems, to develop automatic information and management system (AIMS) based on the shared software platform.

Based on the developed structural chart a new interface was designed. The webpage scalability and memory-expansion granularity were improved by using web frameworks. The application of the “flexible modular reference system” made the webpage available from a wide range of devices, from mobile phones to wide screens, with all pre-set functions available.

At the end of 2014, it was decided to put into operation the Student Academic Progress Records module based on the relevant resolution. For the purposes of winter examination period for full-time students, official transcripts for all curriculums were generated automatically.

In 2015, there has been on-going work on the introduction of the Galaktika University Management information system based on the Galaktika ERP platform and the Galaktika Class Schedule based on the Galaktika Xafary platform. So far, the following modules have been in pilot operation: Students Management, Learning Process and Student Academic Progress Records.

For the first time it has become possible to provide the information on students’ performance through the learning-process automation system.

There was a pilot effort to generate Masters’ diplomas with the help of the system. Two other modules have been tested on the Galaktika Xafary platform: the Curriculum and Workload Module. Based on the results of the testing the introduction of this module at the SpbPU was discussed with the developers.

The Galaktika Class Schedule solution is in full-scale operation. Timetables for full-time students are in the system and published on the SPbPU site.

The internal evaluation of the study programme (SP) is made by the SP monitoring covering all main aspects of its provision and intended to improve and ensure the education quality. To do this, the project groups are formed for the SP monitoring.

The monitoring results are followed up by necessary steps to update the SP. The SP updating procedures were brought in compliance with the quality management system standard of SPbPU “Updates to Principal Study Programs (Review, Changes, Revision)” with the usage of the “Monitoring of Principal Study Programs” methodology.

To control education quality different kinds of Internet testing proposed by the RDI for Education Quality Monitoring are used. The results of the Internet-tests of SPbPU students which were conducted by the Quality Management Centre in 2014/2015 school year under the projects of the RDI for Education Quality Monitoring were also presented in their summary forms in the issues of the series “Quality Management at Polytechnic University.” The SP QMS considers the Internet testing for students the most important stage in the education quality monitoring and a measure to improve the performance and the quality in higher education.

Decisions about the quality assurance and improvements are made based on the findings from the internal monitoring and external audits. All activities are in line with the approved “Action Plan to Prepare FSAEI HE Saint-Petersburg State Polytechnic University for Development, Implementation and Certification of Quality Management System in T&E against GOST ISO 9001-2011 (ISO 9001:2008)” The Test-Saint Petersburg, LLC was chosen as a certification agency. It is not only a recognised leader in the North-West Region, but also at the national level. According to the Audit Plan, in December 2014, a certification audit was conducted. It did not find any discrepancies.

#### **4.2 Follow up on the results of quality assurance procedures**

Further improvement to the management system is connected with the increasing attention from the Russian Ministry of Education and Science to quality assurance in education, including the introduction of mandatory external evaluation of the graduates’ education quality. A prospective plan was drawn up to involve the SPbPU institutions into the quality management system development, followed by the QMS certification.

Upon this project completion, a long-term programme will be made for the period until 2019 to introduce the QMS in all SPbPU institutions.

Until 2020, all three QMS directions are expected to be combined to make an integrated SPbPU QMS. Thus, by 2020, the integrated quality management system of FSAEI HE SPbPU may be made and certified.

The Quality Management System Certification at the SPbPU so far has covered three areas of activities performed by the University: providing educational services in the higher education (HE) programmes implemented in accordance with the University’s license; providing educational services in the programmes of further professional education (FPE), including professional

retraining and development; fundamental and applied research into natural and technical sciences, social sciences and the humanities in agreement with the University's profile.

The certification audit of the study programmes' provision was first held in 2007, the certification of research activities took place in 2012, and the certification of the delivered study programmes took place in 2014.

The outcomes of the certification audit are laid out in the Audit act of the quality management system. No discrepancy was found.

### **4.3 Conclusions**

The Peer Group has come to the conclusion that the HEI on the whole and the Institute in particular have a number of quality assurance mechanisms in place, which are present in the module system: Students Management, Learning Process, Student Academic Progress Records and SP monitoring.

The strength of the programme is availability of the Quality Management System and its on-going modernization.

The weakness of the programme is the underdeveloped quality management system because it was only recently established.

The Quality Management System should be enhanced. Clear goals should be identified and connected to the analysis of surveys/questionnaires results. It is necessary to implement a mechanism for collecting and analyzing survey/questionnaire results and ensure their relevance for constant education quality enhancement. The HEI should document the outcomes of the internal quality assurance system (results of surveys/questionnaires, student workload analysis, learning outcomes and graduates' employment analysis), which will be taken into consideration for further improvement of the programme. The published documents will also ensure the transparency of these mechanisms.

### **4.4 Recommendations of the Peer Group:**

1. It is necessary to further improve the quality management system. The students' questionnaires should be differentiated according to the Bachelor's and Master's levels, and there also should be surveys of graduates and employers.
2. When designing and conducting surveys of students and employers, and also when analyzing the results and providing feedback it is recommended to involve representatives of students, graduates and employers.
3. Measures developed on the survey outcomes should be documented and published transparently, including their publishing on the University website.

## 5 Conclusion

Based on the interviews with representatives of different groups, the management of the University, Institutes, Departments and students, and with reference to the self-evaluation report, the Peer Group concludes that on the whole all the necessary provisions are in place for successful implementation of the Double Degree Programme under accreditation. Goals and objectives, scope, diversity of content, quality of teaching and the quality management system of the programme can be evaluated as good. The experts also noted the fact that the Master's study programme provides solid preparation of the graduates for the next step – a Doctorate programme.

It is fair to say that available resources are fit for purpose. Some deficiencies were found only with regard to the cluttered environment of the laboratories. However the experts had an opportunity to see a new building of the research centre, where the issue of laboratory equipment location will be undoubtedly resolved.

Decision making processes are transparent and effective. Nevertheless, the Peer Group noted that in some cases students are not involved in the decision-making processes.

Learning environment can be evaluated as very good. The organization of the study programme and the tutorship of students are also good. However, the contents of the curriculum modules should be more structured, compact and more easily accessible for students.

The Peer Group can testify to the fact that there are a number of quality assurance mechanisms in place, which are present in the module system: Students Management, Learning Process, Student Academic Progress Records and SP monitoring. Also the experts consider that one of the weaknesses of the programme is the underdeveloped quality management system because it was only recently established.

In this connection the University is planning to conduct a survey of students, graduates and employers. Besides, the experts recommend that measures developed on the survey outcomes should be documented and published transparently. The experts also believe that it is very important to involve students in designing and conducting surveys of students and employers, and also in analysing the results and providing feedback.

Based on the analysis of the University website the Peer Group recommends to use mass media and internet resources for publicizing the programme/ including the University's own website.

## 6 Recommendations for the Accreditation Commission of ACQUIN and the National Accreditation Board of NCPA:

The Peer Group recommends the following decision: **Accreditation with conditions.**

**Conditions:**

1. The curriculum of the study programme should reflect the real state of things, be presented in a condensed form and be easy to comprehend. The elective courses should be highlighted in the curriculum.
2. The Module catalogue (summaries of all modules including work placement and Master's research paper) should be presented in a form which contains the main elements of the module's description. The summary of a module should contain the module title; the name of a person responsible for the module; subject scope; objectives (learning objectives and competencies); module disciplines; the number of ECTS credits; credit distribution for lectures, seminars and practical classes, and information about learning outcomes of the module.
3. All documentation relating to the study programme should be accessible and transparent.

## **Annex 1**

### **7 The scale of assessment parameters of the study programme**

No	NCPA Standards	Assessment of the study programme			
		Full compliance	Substantial compliance	Partial compliance (needs improvement)	Non-compliance
1.	Policy (mission, vision) and procedures for quality assurance		+		
2.	Approval, monitoring and periodic review of study programmes			+	
3.	Assessment of student learning outcomes (competencies)		+		
4.	Quality assurance of teaching staff	+			
5.	Learning resources and student support		+		
6.	Information system providing effective implementation of the study programme			+	
7.	Public information			+	

### **8 The scale of assessment parameters**

1. Full compliance. The Review Panel members consider the study programme (a cluster of programmes) under review fully compliant with the requirements with regard to a particular criterion (standard) The indicators are clearly determined and related to the mission, regularly reviewed and upgraded. The experience and practices can be recommended for dissemination.
2. Substantial compliance. The Panel members consider the study programme (a cluster of programmes) under review fully compliant with the requirements with regard to a particular criterion (standard). The indicators are determined clearly enough and correlate with the mission and users' requirements.
3. Partial compliance. The Panel members think that with regard to a particular criterion (standards) the compliance has been achieved, but the level of compliance is not high enough. The indicators are determined in a general way and documented, clearly related to the mission. The study programme (a cluster of programmes) has (have) closely approached the threshold level of compliance with the NCPA Standards.
4. Non-compliance. The Panel members consider that the study programme (a cluster of programmes) under review fails to comply with the NCPA accreditation requirements. Activities are carried out at a low or poor level of quality, there are a lot of deficits and problem areas, the indicators are not clearly determined. The deficits have a negative

influence on the realization of the programme's mission. The Panel gives necessary recommendations for the correction of the revealed weaknesses.

#### **IV Decision of the Accreditation Commission of ACQUIN**

##### **1 Accreditation Decision**

On the basis of the report of the expert group, the statement of the HEI and the statement of the Standing Expert Committee, on March 31st, 2016, the Accreditation Commission of ACQUIN takes the following decision:

##### **Metallurgy (Master)**

**The double degree study programme «Processing Technologies of Materials» (“Metallurgy”) (Master) is accredited with the following conditions:**

- **The Module catalogue (summaries of all modules including work placement and Master’s research paper) should be presented in a form which contains the main elements of the module’s description. The summary of a module should contain the module title; the name of a person responsible for the module; subject scope; objectives (learning objectives and competencies); module disciplines; the number of ECTS credits; credit distribution for lectures, seminars and practical classes, and information about learning outcomes of the module.**
- **All documentation relating to the study programme should be accessible and transparent.**

**The accreditation is limited until December 31<sup>st</sup>, 2017. In case of stating the fulfilment of conditions by the Accreditation Commission after submitting documents not later than April 1<sup>st</sup>, 2017, the study programme will be accredited until September 30<sup>th</sup>, 2021. The accreditation is not prolonged if there is no evidence for the fulfilment of conditions.**

**The accreditation procedure can be suspended by request of the HEI for up to 18 months, if there is the prospect that the HEI is able the correct deficits within this period. A statement of the HEI requesting a suspension has to be submitted to ACQUIN by May 20<sup>th</sup>, 2016.**

For the further development of the study programme the following recommendations are given:

- The Quality Management System should be enhanced. Clear goals should be identified and connected to the analysis of surveys/questionnaires results. It is necessary to implement a mechanism for collecting and analyzing survey/questionnaire results and ensure their relevance for constant education quality enhancement. The HEI should document the outcomes of the internal quality assurance system (results of surveys/questionnaires, student workload analysis, learning outcomes and graduates’

employment analysis), which will be taken into consideration for further improvement of the programme. The published documents will also ensure the transparency of these mechanisms.

- It is recommended to continue active cooperation with local employers in order to develop a common concept of the study programme, to work out the requirements as to Master's dissertations, involving the partner institution and industrial companies. It is also important to develop a concept of the graduates' transition to professional life. It is necessary to seek opportunities for funding students' education by the third parties (for example, employers)
- In order to increase the effectiveness of students' work the University should facilitate expanding laboratory facilities, which were visited by the Peer Group during the site visit.
- It is advisable to synchronize the curricula of the partner-institutions. The management of the University should develop mechanisms which will make the study process more flexible for the students who have to wait for a long time for an opportunity to defend their dissertation upon return to the home institution.
- It is necessary to enhance the language proficiency by way of organizing optional language courses for students who take part in the exchange programme.
- It is necessary to further improve the quality management system. The students' questionnaires should be differentiated according to the Bachelor's and Master's levels, and there also should be surveys of graduates and employers.
- When designing and conducting surveys of students and employers, and also when analyzing the results and providing feedback it is recommended to involve representatives of students, graduates and employers.
- Measures developed on the survey outcomes should be documented and published transparently, including their publishing on the University website.

The Accreditation Commission changes the proposal of the expert group as follows

Cancellation of a condition:

- The curriculum of the study programme should reflect the real state of things, be presented in a condensed form and be easy to comprehend. The elective courses should be highlighted in the curriculum.

Justification:

As recommended by the Standing Expert Committee, this condition is cancelled on the basis of the subsequently submitted documents of the HEI.

## **2 Fulfilment of conditions**

The Higher Education Institution has submitted the documents that prove the fulfilment of the conditions in due time. These documents have been forwarded to the Standing Expert Committee with request for examination. The Standing Expert Committee came to the conclusion that the conditions are fulfilled.

Based on the statement of the Standing Expert Committee, on July 3<sup>rd</sup>, 2017, the Accreditation Commission of ACQUIN took the following decision:

**The conditions of the study programme “Metallurgy” (B.A.) are fulfilled. The accreditation period is extended until September 30<sup>th</sup>, 2021.**