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REPORT
on Results of the External Programme Assessment "Cartography and Geoinformatics" Saint Petersburg State University

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SUMMARY OF THE PROGRAMME

The programme "Cartography and Geoinformatics" is implemented by the "Cartography and Geoinformatics" Department in St. Petersburg State University and results in awarding of the Bachelor's degree qualification. The associate professor of the "Cartography and Geoinformatics" department, Kapralov Eugene Gennadievich, directs the programme.

The site visit within the framework of the external programme assessment procedure is carried out by the experts in the period of March 6 - March 7, 2018.

Strong points of the programme under analysis

1. Universality and completeness of the training provides a high competitive ability of the programme graduates.
2. The modern teaching level is ensured by including in the programme the disciplines that reflect the modern trends and developments of the branch (special methods of aerospace photo decoding, processing and decoding of radio location and hyper spectral photos).
3. Good connection with manufacturing and orientation to the needs of the labour market Taking into account of employers' opinions during development of the course programmes, subjects of the graduate qualification works, programmes of practical training.
4. The programme gives the possibility to choose the education trajectory in four training programs: cartography, geoinformatics, aerospace methods and geodesy that allows taking into account the students' interests and flexibly in responding to the current needs of the regional labour market.
5. A high level of teaching and demand for the graduates ensures a high motivation of the students to training.

Weak points of the programme under analysis

1. Reasoning and logics of the elective course system on the offered educational paths (geodesy, aerospace methods, cartography, geoinformatics) can be nullified by the absolute free selection of the elective courses by the students. Choosing of the courses that are not connected between each other as a result of its lack of experience or its wish to minimize the efforts a student will not obtain an in-depth training in the particular field. In this case we cannot speak about a logical and systematized sequence of education.
2. There appeared to be little exploration of future needs (and opportunities) for the programme. The staff are so busy with meeting the needs of their excellent programme, because they are generally under resourced.
3. The programme only marginally deals with Web and mobile mapping.

Key expert recommendations on the programme

1. To correlate the wording of the competencies with the professional standards of the branch (geodesy, cartography, photogrammetry) in the process of their development and approval.
2. To perform a serious explanatory work with the students during determination of the individual paths of their education. To explain what set of the elective courses will allow to obtain an in-depth training on the offered educational paths (geodesy, aerospace methods, cartography, geoinformatics) and which of this training programs is in the most demand in the labour market.
3. To correct if required the list of the elective courses based on the analysis of the students' preferences during selection of the elective courses and the current needs in the labour market.
4. To work on the interdisciplinary links between the professional and general professional disciplines, make a list of the basic general professional concepts, definitions for which have a priority importance for forming of the professional competencies. On that concepts the teachers of the general professional disciplines shall place greater focus. (For example, special attention shall be paid to the concept of low water sage of the rivers and lakes in hydrology)
5. To continue the started work on creation of on-line courses with the possibility of their use not only during training of the students but also for commercial purposes
6. Short-term (1-2 years) contracts with the teachers shall not be widespread. Such contracts do not assist in planning of the scientific and methodological work by the teachers even in the mid-term perspective. The administration of the St. Petersburg State University (SPBU) is recommended to increase the terms of the contracts with the teachers up to 5 years long in case of absence of any complaints on their work. As according to the questionnaires 18% of the teachers think to change their work.
7. To develop the young teacher support system, assist in participation in the conferences, internships organization, stimulate the young teachers to the work on the theses, hear regularly the results of their work on the theses in the Department meetings.
8. To develop the different forms of the scientific and learning and teaching collaboration (internship periods, joint scientific projects, holding of guest lectures, master classes etc.) with other institutes of higher education both with Russian and with foreign ones.
9. To organize the further training of the teachers on the problems connected with use of modern technologies and teaching methods.
10. Web and mobile mapping area will increasingly become very central to the development of many applications for smartphones and tablets. The department should look to increase this area in the programme and integrate it more into their modules.
11. The team should have high ambitions for ongoing developments as the programme has huge growth potential. This should be addressed jointly by the

team, the Faculty and the University. It is recommended the development of a 5-year business plan encouraging growth and development in the bachelors course which examines this and identifies a clear vision for the future and an action plan to achieve it.

12. Institutional support urgently needs to be increased. The programme staff currently perform many roles that should be supported centrally, for instance, sorting out computers, loading software and organising internships. It is a rapidly changing work environment and the programme will need to be adjusted to meet ongoing, changing needs. We recommend to consider a possibility to delegate some functions of the teachers, for example, work experience internship organization, to the centralized services.

13. In order to maintain and develop the programme, the following are ideas that should be explored by the team:

- Entrepreneurship - a module should be developed in this area to support the rise of freelance geo informatics employment
- Citizen science - a good connection to others in the Faculty and more widely in the university would be to consider the development of Citizen Science modules and joint Citizen Science projects, research and course developments

14. The department should map what they are doing against professional society accreditation like RICS in the UK.

15. The faculty needs to improve the look and feel of their “geographical” space - posters and research, student work and other things should be placed on the walls in the new rooms and corridors so that the building and spaces should become more clearly a geo-faculty and department area.

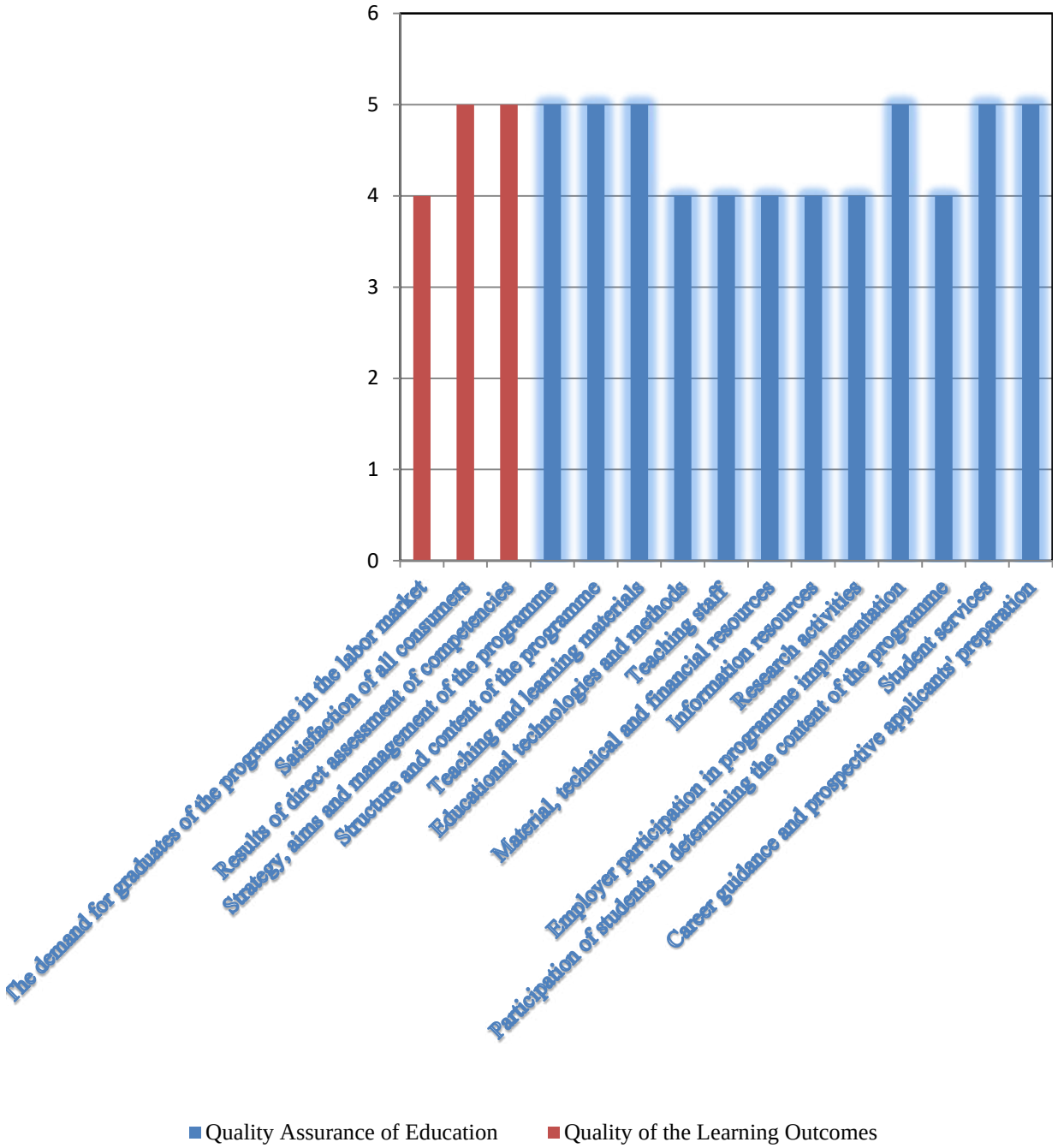
16. It is recommended employing an expert in the field (entrepreneurship and GIS) to diversify the income generation and increase the potential to develop high quality research programmes.

Assessment profile of the learning outcomes and quality assurance of education

No.	Criterion		Assessment
I	*Quality of the learning outcomes*		
	1.	The demand for graduates of the programme in the labor market	*4*
	2.	Satisfaction of all consumers	*5*
	3.	Results of direct assessment of competencies	*5*
II	*Quality assurance of education:*		
	1.	Strategy, aims and management of the programme	*5*
	2.	Structure and content of the programme	*5*
	3.	Teaching and learning materials	*5*
	4.	Educational technologies and methods	*4*

	5.	Teaching staff	*4*
	6.	Material, technical and financial resources	*4*
	7.	Information resources	*4*
	8.	Research activities	*4*
	9.	Employer participation in programme implementation	*5*
	10.	Participation of students in determining the content of the programme	*4*
	11.	Student services	*5*
	12.	Career guidance and prospective applicants' preparation	*5*

Assessment profile of the learning outcomes and quality assurance of education



QUALITY OF THE LEARNING OUTCOMES

1. Demand for the graduates of the programme on the federal and regional labor market

Criterion assessment: Good

Analysis of the role and place of the programme

The programme "Cartography and geoinformatics" is implemented since 2011. The programme can be considered as a successive one relative to specialist programme 020501 "Cartography" and 080801 "Applied informatics" (in Geography) which were implemented in SPBU up to 2011. This SPBU programme is a fulltime programme provided on either state-funded or contractual basis with a standard study period of 4 years under the Educational Standard of Saint Petersburg University.

In view of lack of professional standards in the cartographo-geodetic sectors the Programme is developed taking into account the requirements of the professional standards in the related industries. The requirements of the following professional standards are taken into account:

- Professional standard "Specialist on use of geo information systems and technologies for solution of the problems at the state and municipal level".
- Professional standard "Specialist on space services rendering based on use of the Earth remotely sensed data from space"
- Professional standard "Specialist in the field of engineering and geodesy survey"

The data specified in the self-evaluation report was confirmed during the site visit. The region and its leading enterprises are interested in the graduates of the training program "Cartography and geoinformatics". SPBU trains the bachelors and orients to the needs of St. Petersburg, Leningrad region and North-West region as a whole. The region has a high need in specialists in the cartography field. More than 100 enterprises have license for carrying out of cartography activity, there are much more enterprises with geodetic field of study that can serve as a base for employment of the graduates. The most of enterprises that prepare sea maps are situated in St. Petersburg. HeadHunter (http://hh.ru) estimates the demand for expert in the field as follows:
Cartographer, 11 jobs; GIS Expert, 8 jobs; GIS Engineer, 9 jobs; Mapinfo Expert, 10 jobs; GIS Map Expert, 12 jobs; and Geodetic Engineer, 32 jobs. The demand is very high so bachelor students are employed even before they graduate.

Characteristics of the competitive environment in this area

SPBU is the only institution of higher education in its region that trains bachelors on training program "Cartography and geoinformatics" and it has competitors represented by a number of institutions (National Mineral Resources University, Petersburg Railway University, St. Petersburg university of architecture and civil engineering etc.) during training of the specialists in the field of geodesy and remote sensing.

Analysis of information indicators submitted by the higher education institution

- *The percentage of students combining study at the higher education institution with work in their specialization field: 80% of students work in the fourth year*
- *The percentage of graduates who found employment within one year after the graduation from the educational institution in the field of training (specialization) within the programme: Most graduates of the programme have found employment in the industry as senior students.*
- *The percentage of graduates employed on request of corporate employers: 0%*
- *The percentage of students trained on request of employers, for example, under tripartite (target) agreements: 0%*
- *The percentage of graduates working in their specialization fields within the region: 83%*
- *Part of the graduates' contingent that works according to its educational program specialization outside the region: 17%.*
- *The number of complaints on graduates: 0%.*
- *The number of positive reviews of organizations on the work of graduates is 18*
- *The percentage of students in the programme admitted for Master's programmes who have completed training under Bachelor's programmes: 67%*
- *The percentage of graduates of the educational institution in the programme as related to that of graduates of all other regional higher education institutions in the programme: 100%*

Recommendations:

1. The university should consider significantly expanding the programme. The labour market situation in the field continues to grow and expansion and new developments and scientific research should be encouraged.
2. An entrepreneurial approach would work well in this field as many employers need many more graduates and experts with GIS skills. Thus, it is recommended the formulation of a 5 year business plan for the programme and related consultancy and training opportunities. The excellence of the team and necessary updates to the course can be maintained.

2. Satisfaction of consumers with the learning outcomes

Criterion assessment: Excellent

- *The percentage of employers who believe that the competencies of graduates of the programme:*

• fully comply with the requirements to modern experts in the industry: 64%

• essentially comply with the present-day requirements to experts in the industry with minor reservations: 36%

• there are few graduates whose competencies comply with the present-day requirements to experts in the industry: 0%

• do not comply with the present-day requirements to experts in the industry: 0%

- *The percentage of graduates satisfied with the learning outcomes: 100%*

3. Direct assessment of competencies by the experts

Criterion assessment: Excellent

During the visit, a direct assessment of the competencies of graduate students was conducted. In direct evaluation, students of the 4 (fourth) year of the Master's Programme took part in the number of 9 people, which is 100 % of the graduate course.

In the process of direct assessment, test and exam materials developed by the educational institution were applied as far as the expert considered these materials as valid.

To analyze the formation of competencies, the experts selected the following:

- Assessment of competencies characterizing the individual's personal qualities as an integral part of their professional competence:

GCC-3 Has a high cognitive culture and capable of perceiving, generalizing, and analyzing information, setting goals and choosing solutions, capable of

analyzing philosophical, world outlook-related problems as well as problems of social and personal importance

GCC-6 Knows the fundamental principles of research methodology and is prepared to apply acquired knowledge and skills to solve practical problems in the course of training as well as professional and social activities

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

GCC-2 Prepared to interact with colleagues for team work, capable of analyzing experience, adapting to various situations and demonstrating creativity, initiative, and perseverance in attaining professional goals

GCC-11 Graduate of the University with "bachelor" qualification (degree) that receives higher education for the first time shall know English at the level that shall be comparable with level B2 according to the All-European scale of foreign-language communicative competence

- Assessment of professional competencies ("competence core"), including the competencies reflecting the need (requirements) of the regional and/or federal labor market, depending on the main consumers of the graduates of the programme:

PC-12 Shall have professional profile knowledge in the field of theoretical and practical cartography and geoinformatics.

PC-13 Shall know the methods of mapping, editing, preparation to publication and publication of topographic, thematic maps and atlases in the conventional analog and digital forms

PC-21 Shall know GIS interface, data formats, spatial data entry and enquiry organization in GIS

During the procedure of the direct assessment of competencies the experts used the questions that had relation to the special features of the mathematical fundamentals of the hydrographical charts, special features of preparation of common geological (topographic) maps, data formats, methods of entry and data binding.

Based on the direct assessment of competencies results, the experts have discovered the following:

Level / Percentage of students	Sufficient level (students coped with 80 % of the proposed tasks)	Acceptable level (percentage of tasks solved: 50 to 79 % of the tasks were completed)	Low level (percentage of tasks solved: less than or equal to 49 %)
Results of direct assessment of competencies characterizing the individual's personal qualities as an integral part of their professional competence			

90%	+		
10%		+	
The results of direct assessment of competencies aimed at the development, maintenance and improvement of communications			
90%	+		
10%		+	
The results of direct assessment of professional competencies ("competence core"), including the competencies reflecting the need (requirements) of the regional and/or federal labor market, depending on the main consumers of the graduates of the programme			
90%	+		
10%		+	

When conducting the quality assessment of education, the experts got acquainted with 3 graduate qualification works, which amounted to 19 % of the graduate works of the previous year in this direction. The experts concluded that the analyzed graduate qualification works complied with all the requirements stated below.

GRADUATE QUALIFICATION WORKS

No.	Objects of assessment	Expert commentaries
1.	Topics of graduate qualification works correspond to the field of study and current level of scientific and/or technological development in the programme field.	100%
2.	The tasks and contents of graduate qualification works are aimed at demonstrating competency formation in the graduate.	100%
3.	The degree to which data collected or received during the predegree practice and the implementation of course projects was incorporated in the independent research part of the graduate qualification works.	The materials of the term papers were used during writing of 33% graduate qualification works.
4.	Graduate thesis topics are defined by the needs of manufacturers as well as the experimental purposes of teachers of the educational institution.	All employersб who gave their view on graduate qualification works noted the urgency for St. Petersburg.

5.	The findings of graduate qualification works can be applied in industry.	No such data
6.	The degree to which research findings of the Department, faculty and outside research and production and/or research organizations was incorporated in the independent research part of the graduate qualification works.	0%

Conclusions and recommendations of experts

Conclusions

Students are in work before they graduate. They have a higher than average salary and are rapidly promoted or set up their own companies. The high level of achievement was clearly demonstrated by the graduates during on-site visit.

Recommendations

1. The university should examine opportunities for further developments in this area (increase the intake and create new modules) as the needs of the local market are not being fully met. Students don't even have time to graduate before full-time employment in an increasing number of cases because the demand for them and their skills is so high.
2. Growth should be envisaged and planned for, but also new developments – especially for online training courses, which can and should be income generating.
3. Even more partnerships with local employers should be actively encouraged. These can support investment in the programme and resourcing – especially equipment and software.

QUALITY ASSURANCE OF EDUCATION

1. Strategy, aims and management of the programme
Criterion assessment: Excellent

Strong points of the programme

Employers and students highly praised the department, the strategy aims and management of the programme.

The development strategy for the Bachelor degree programme "Cartography and Geoinformatics" for 2017–2022 was discussed and approved at a meeting of the Department of Cartography and Geoinformatics, SPBU Earth Science Institute on 19.01.2018, Minutes No. 1. The strategy was developed with due regard to the following factors and conditions:

- the prospective economic and social development of the Russian Federation;
- increase in society's demand for information and the extending scope of scientific, practical, and educational application of geographical information technology;
- the transition of the national economy to a digital mode and the associated development of the information spacial infrastructure;
- globalization and international integration on the one hand and political and economic challenges on the other hand;
- the rapid development of high technology and increasing research intensity of geodesy, cartography, and Geoinformatics, in particular import phase-out trends;
- an extensive implementation of professional standards, etc.

Recommendations

1. The employers were concerned about the lack of future thinking in the strategy to meet their growing needs and the rapidly changing external economic environment. There is an urgent need for future planning for growth. The sector is expanding at 12-15% per annum and the demand from graduates already cannot be met and places are unfilled. In order to address this, a strategic business plan should be developed with the Faculty and programme team, which allows their skills and expertise to be further developed and courses, training, consultancy and other business opportunities to be planned for and developed. This is turn would support additional resourcing which is urgently needed to maintain high quality provision.
2. Employers, students and graduates were highly critical of central services. The programme needs to work with state of the art equipment and software, to ensure the graduates are best prepared for the employment opportunities available

to them. This should be delivered centrally – however there are major flaws in the central IT support system, where software updates are ordered but not followed up, computers are not updated and equipment is not provided when needed. As a result programme staff waste a lot of time trying to fix things and install software which should have been done centrally.

3. It is recommended the central support IT system is reviewed and changes made to ensure latest software updates are provided each semester. Orders should be followed up and an open, transparent database system of IT support is put in place. This will allow the tracking and reporting of support jobs and upgrades.

4. It is recommended obtaining a campus-wide licence for ArcGIS (the state of the art GIS software). The international expert already placed the programme leaders in contact with the suppliers as a software donation may be possible.

5. It is suggested having a student licence system so students can use the software at home on their own devices should be implemented. This will allow the Cloud-based systems to be used widely across the campus. It will also enable collaborative research and development projects to be initiated.

6. A further issue is the low level of use of the e-learning system and the lack of pedagogical support from central services. A central pedagogical unit should be set up to support the use of Blackboard for e-learning

2. Structure and content of the programme

Criterion assessment: Excellent

Strong points of the programme:

1. Good connection with manufacturing and orientation to the needs of the labour market Taking into account of employers' opinions during development of the course programmes, subjects of the graduate qualification works, programmes of practical training.

2. The breadth covered by the programme, means that the programme goals correspond closely to the goals and objectives of the professional activities of graduates. There was evidence of high quality enquiry-based project activities and first class dissertation work often with the use of field studies.

Recommendations*:*

1. The work on reviewing syllabi shall be continued by the representatives of the employers community (reviews of the syllabi on cartography shall be received)

2. The university should seek to maintain the breadth of opportunities in the programme as this was commended by the employers and ensures flexibility in the graduates, while allowing specialisation of staff and new developments required in the field. For instance developing citizen science with other members in the faculty and other faculties. This will also offer opportunities for more applied research.

3. Teaching and learning materials

Criterion assessment: Excellent

Strong points of the programme

1. A large portion of programmes in cartography, geoinformatics, remote sensing, and geodesy is based on modern achievements in science, technical progress, technology, and management. Even classical disciplines such as Mathematical Cartography, Astronomy, History of Cartography, and Atlas Mapping largely rely on state-of-the-art science and technology. E.g. Astronomy includes satellite-based navigation, Mathematical Cartography uses modern algorithms and software for cartographic projections and coordinate system transformation, such as GDAL and Proj4 libraries, etc.
2. Field equipment resources are well-organised allowing students to benefit from practical experiences.

Recommendations*:*
1. Purchasing of specific resources – like UAVs, drones - should be prioritised. Support for this may be sought from employers or the costs shared if obtained as a result of joint collaborative projects with other faculties in the university.
2. Updating and repairing of equipment is important – sufficient resources need to be allocated to the faculty for this.

4. Educational technologies and methods
Criterion assessment: Good

Strong points of the programme:
1. The following is used in the process of educational programme implementation: lectures, demonstration experiments, exercises, workshops, briefings, discussions, working on educational literature, and preparing reports and presentations.
2. Use of new information technologies and access obtaining to the educational virtual space, different systematized educational information result in increase of the students' motivational aims and optimization of disciplines study on the training program through individualization of the process and interactive nature of the interaction.

Recommendations*:*
1. It is recommended to update GIS software on the computers used during teaching of the programme. During the visit experts saw that there are not enough computers with latest GIS software. The versions available were quite dated, despite orders for upgrades being approved they have yet to be supplied. The problem appears to lie with the central purchasing unit and IT Services. There is little or no communication between these central services and the teaching staff / faculty. As a result software upgrades on order more more than one year have not yet been made available to staff or students. The teaching staff have resorted in

some cases to uploading the software themselves and dealing with other technical issues because central support was not available.

2. It is recommended to consider the issue of student licences and campus-wide software. This would solve many of the issues raised during the site visit and allow many different programmes to benefit from the software concerned. Plans should be put in place to make the ArcGIS suite of software made centrally available to all students and staff, as well as open source alternatives. A system for student licencing should be developed and used.

3. The university should consider establishing a virtual expert system to support staff with e-learning or better to create a unit specifically for this - to make much better use of their Blackboard system. Support should be established from the central university for Blackboard, not technical but developments in pedagogy. The goal would be to develop teacher excellence and expertise in it’s use and then share it across all faculties. The central unit should do that across the university.

It is recommended some pedagogical training is made available to staff members in the use of Blackboard, this should be done by e-learning experts. In the longer term the university can best do this and maintain relevance by establishing a central unit to support staff and experiment with latest updates and opportunities. A system of faculty champions can be initiated with competition between staff for innovative uses and rewards such as conference attendance.

Experts noted during site-visit that Blackboard is not being used for e-learning at all. The reason is because the academic and administrative staff members have not had pedagogical training or support to help them develop its use. As a result it is largely employed only as a document store and the e-learning functionality of Blackboard is largely redundant. This is a huge waste of money for the university as Blackboard has a lot of potential.

4. The rise of BYOD (Bring Your Own Device) and the Cloud is changing how resources, courses and learning should be organised - a special group should be set up to explore the challenges and opportunities. A member of the GIS department should be involved.

5. Generally speaking there needs to be much more central support for teaching - not psychology but pedagogy. This should be mirrored in the department with a member of staff given responsibility and time to develop this.

6. There should be more involvement in online developments. This should be part of the business plan as there are lots of opportunities for income generation through offering professional training and re-training.

Additional material

During the visit, the experts attended a class, the analysis of which is presented below.

Teacher's full name Litvinova M.V.
Group/ speciality the 2nd year on the Bachelor degree programme

1. Discipline/ module Drawing up and design of computer and electronic maps
2. Learning session type
□ practical classes
3. Subject of the learning session:
4. Goal of the learning session: Study of work basics in QGIS program
5. Objectives of the learning session: Raster binding and horizontal lines digitization
6. Material and technical support of the learning session: Computers with installed software, fixed screen, projector.

ASSESSMENT OF THE TEACHER

No.	**Analysis criteria**	**Indicators**	**Rating (0, 1, 2)**
	Compliance with the training schedule	Timely start and end of class, time-balanced sections.	2
2.	Organizing time	Greeting. Topic, goal messaging (connection of the goal with the competences formed).	2
3.	Motivation of listeners for upcoming activities	Indication of relevance, the formed professional and / or social and personal competencies.	2
4.	Psychological climate in the audience	The presence of positive emotional interaction between the professor and students; mutual benevolence and audience involvement.	2
5.	Quality of presentation	Structured material; the clarity of the definition of current tasks; systematic and accessible presentation; adaptability of presentation to the peculiarities of the audience; availability of examples, relevant facts.	2
6.	Conformity of the content to the course programme	Compare with working curriculum of the discipline (teaching and learning materials).	2
7.	Use of visual materials	A textbook, a workshop, handouts, tables, drawings, etc.	2
8.	Oratory	Audibility, intelligibility, euphony, literacy, speech tempo; facial expression, gestures, pantomime; emotional saturation of the performance.	2
9.	Feeling the audience	The ability to respond in time to changes in perceptions of the students.	2

10.	Civility in relation to students		2
11.	Methods of organizing attention and regulating students' behavior	Increase of interest among listeners (original examples, humor, rhetorical techniques, etc.); involving listeners in a dialog, into the process of performing tasks, etc. But not: open call for attention of listeners; demonstration of disapproval; psychological pressure, blackmail.	2
12.	Maintaining "feedback" with the audience during the class	Learning control	2
13.	Summarizing the learning session *(reflection organization)*	The organization of reflection, during which students actively discuss the outcomes	2
14.	Image	Compliance with corporate style, presentability, charisma	2
15.	Final grade		2
16.	Notes and suggestions of an expert: The class purpose was study of the students to work in QGIS program. The teacher explained the sequence of the work with demonstration of the sequence of operations on the screen. In the process of the classes the teacher answered the questions of the students, asked questions on the materials already studied, exercised individual control of the correctness of the tasks carried out by each student. The class was held in a quiet business-friendly atmosphere.		

While performing the desktop analysis of the report on self-evaluation, the analysis of the curriculum and the schedule of the classes, the experts determined that the percentage of learning sessions in an interactive form on the programme on average is more than 56.2 %.

5. Teaching staff
Criterion assessment: Good

Strong points of the programme:

The academic members of staff are well qualified to deliver the programme. It is a credit to them that they maintain high levels of commitment and engagement, despite few opportunities for professional development available to them.

***Recommendations**:*

1. To develop the young teacher support system, assist in participation in the conferences, internships organization, stimulate the young teachers to the work on the theses, hear regularly the results of their work on the theses in the Department meetings.
2. To organize the further training of the teachers on the problems connected with use of modern technologies and teaching methods.
3. Working with industry on joint projects should be encouraged, this may involve – secondments from teaching, staff internships and other opportunities. Possible entrepreneurial activities should be encouraged and developments with the public and private sector well remunerated.
4. More resources and opportunities need to be provided to academic staff on the programme by the university to avoid disenchantment and reduction of motivation. Training of staff needs to be a high priority - upskilling them in their rapidly developing area is necessary for all staff. Resources should be provided for this. Staying up to date is a rapidly changing area is very challenging, largely because few (no) opportunities are available for development and professional development and conference attendance has been rejected.
5. There needs to be much more central support for teaching - not psychology but pedagogy. There should also be help available in the faculty with a member of staff given responsibility and time and encouragement to develop this area.
6. The department needs much more international development for staff - opportunities to see how other departments and units are developing e.g. Munich, Salzburg, UCL
7. The university must encourage the staff by allowing them to develop professional online courses - each year lecturers apply but they are not accepted. There is a lot of frustration at the time being wasted in this. More resources need to be made available and the department should be encouraged. The existing system leads to lack of confidence and career progression
8. The university should find ways of promotion of its staff, for example: to professor, Ass. Professor. There appear to be no (few) such promotion opportunities for staff.
9. International activities need to be more developed. Engaging expert staff on secondment / sabbatical will help raise the international profile bring lots of fresh and innovative ideas into the team
10. It is recommended employing an expert in the field (entrepreneurship and GIS) to diversify the income generation and increase the potential to develop high quality research programmes.

6. Material, technical and financial resources of the programme

Criterion assessment: Good

Strong points of the programme

100% of classrooms used in the educational process are equipped with the required modern equipment. Lecture classrooms are equipped with projection equipment, classrooms for practical classes - with computers, projection equipment and software with open code Lasarus, Python, QGIS, GRASS, SAGA , as well as with domestic software (EasyTrace, ScanExImageProcessor, Photomod).

All educational facilities offer WLAN access.

The university has a unit called Resource Center for Space and Geographical Information Technology with a network of GLONASS/GPS basic stations (three stations in Saint Petersburg, Petrodvorets, and Sablino) and an RPD receiving station by ScanEx, which is currently receiving images from the Modis radiometer.

***Recommendations**:*

1. To bring operatively to the notice of the department information on the software purchase and update regularly the software already installed.
2. There is huge potential for growth in this programme. The university should carefully explore with the staff in the department, future developments for the Department and their programmes. There is considerable potential for growth. The result should be clear aims for the next 5 years and the development of an agreed business plan. The business plan should enable and encourage growth.
3. The faculty needs to be supported in making their accommodation, rooms etc. much more homely and 'geographical'.
4. ArcGIS (the industry standard) should be obtained as a campus licence and include student licences - it can be used in lots of faculties and departments.
5. The University need urgently to have a central site licence service - software updated regularly There are huge administrative problems. There are slow/no responses from central administration to department needs - more than 2 years waiting for software updates in some cases or no response at all in others. The members of staff find it hard to get specific software working on certain machines.

7. Information resources of the programme

Criterion assessment: Good

Strong points of the programme:

All students and teachers have access to all educational electronic resources included in the SPBU's subscription. Any computer with an Internet connection can be used to access the resources using individual logins and passwords that each SPBU student has: http://www.library.spbu.ru/help/ezpr.html, access the on-line learning system at http://www.bb.spbu.ru

A university-wide authentication system (a single login and password) is used, in particular, to access the corporate e-mail as well as on-line resources of the library and the BlackBoard distance learning system. The latter enables interaction between teachers and students. The following services are created within the framework of information systems: http://abc.spbu.ru, https://bb.spbu.ru/,

https://pure.spbu.ru/, https://courses.spbu.ru, as well as https://mail.spbu.ru/. A dedicated resource has been established at https://delo.spbu.ru/ to maintain electronic documentation management.

***Recommendations**:*
It is recommended to hold training courses on the possibilities of SPBU Blackboard system as today the system is used as storage for documents but not as a system for study.

8. Research activities
Criterion assessment: Good

Strong points of the programme
1. The research work of students intensified for the last 3 years.
2. Scientific research is mandatory part of the work of the teachers. The basic directions of the research work are as follows:

- Research using RFBR Grant ("A Study of the Methodological Aspects of Microrelief Simulation and Mapping in a GIS Environment Using Data from Various Sources") an Russian Geographical society.
- Work within the scope of the Federal Special Purpose Program "Researches and developments on priority directions of science and technology sector development in Russia for 2014 - 2015 years"
- Participation in international and Russian conferences
- Organization of International scientific-practical conference "Geodesy, cartography, geoinformatics and cadastres" on SPBU basis. From idea to implementation", 2017
- Publication of research results in the leading scientific publications (indexable Web of Science Core Collection or Scopus).

3. The teachers do researches in accordance with their scientific interests, the results of the research work are used in the educational process. For example, Lasebnik O.A. gives the course "History and methodology of geodesy, cartography and geoinformatics" and her research work is dedicated to the history of cartography and cartographic sources ("Maps and atlases of the XIXth century, collections of the cartography and geoinformatics department of the St. Petersburg university", "Electronic collection, cartographic heritage of Russia").

***Recommendations**:*
1. Generally more research needs to be done and presented and published internationally. As a result the university should offer more opportunities to the department to attend international conferences and share their excellence.
2. In order to avoid staff becoming de-motivated, because there are so few opportunities for them, additional resources should be guaranteed to help them to gather research grants and develop more collaborative research with others. This

may include partnerships with industry and collaboration with other faculties in the university. It should be included as part of the suggested business plan.

3. Opportunities for staff (and even student) conference attendance, including learning and teaching and the use of technologies for teaching, needs to increase.

9. Employer participation in programme implementation

Criterion assessment: Excellent

Strong points of the programme

The employers take the most active part in the development of the programme content and its implementation.

The basic forms and collaboration directions are as follows:

1. The programme management system assumes participation of the employers in the work of the academic and methodological complex of the Earth Sciences Institute and in the Programme council.
2. The experts from the employers are involved on a regular basis in expert examination of the programme (there are two positive responses on the programme) as well as in reviewing of the academic disciplines and practices programme (there are 26 positive responses on the discipline programmes).
3. 11 programmes of academic disciplines were developed with direct participation of the employers.
4. Survey made among the employers on the questions of training quality of the graduates allows to actualize the programmes of the disciplines in accordance with the needs of labour market and demands of production.
5. Participation of the employers in the educational process is expressed in the coordination of the work experience internship programme, its organization and conducting, determination of graduate qualification work themes and doing master class.
6. The representatives of the community of professionals are directly involved in the assessment of the completeness of the students' competency forming. The professional competencies (PCA-8, PCP-2) were developed jointly with the employers.
7. The representatives of the employers are included in the composition of the State Examination Board during State Final Examination. The graduate Qualification Works are reviewed by the employers.

Recommendations*:*

1. To involve the employers in creation of the business plan of the programme development.
2. To perform questioning of the employers for their needs in qualification increase courses for the purpose of further organization of similar courses on a fee paid basis.

3. To hold 1 master class during the academic year with the owner of the company that works in the programme field of study, for explanation of the need of mastering of entrepreneurship fundamentals to the students.

10. Participation of students in determining the content of the programme
Criterion assessment: Good

Strong points of the programme:

Students participate in programme management through the following bodies and procedures:

- the SPBU has a Young Scientist Council. Representatives of the Council present their initiatives at Department meetings and meetings of the faculty's teaching commission.
- representatives of the Student Council of the teaching and research unit are members of Scientific Councils (see the Statute of Saint Petersburg University), Library Councils, Scholarship Councils, and the trade union
- participation in the education quality monitoring two times a year (e.g. Order No. 2903/1 of 15.04.2016 "On Carrying Out the SPBU Student Survey in 2016")

Recommendations:

1. Meetings that link employers and students to the course programme might help avoid misunderstandings and differences in perception.
2. To hold once a year meeting/ carry out questioning with the students of the 4th course on Bachelor degree programme for identification of their wishes for programme updating.

Additional information:

The programme is clearly meeting employers needs – which were quite different to student expectations. The challenge is to mediate between a broad base required by employers, while considering the increasing specialist demands of the students.

11. Student services at the programme level
Criterion assessment: Excellent

Strong points of the programme:

Within the framework of SPBU there is a wide range of extracurricular activities that allow to take into account the students' personalities and inclinations, in particular to facilitate the socialization and adaptation of socially disadvantaged students. Information on scheduled events, conferences, competitions, etc. is posted in Extracurricular Activities (http://www.students.spbu.ru) on the SPBU portal as well as the web pages of the respective units (Student Council, Student Competition, etc.), including the SPBU ESI news feed (http://earth.spbu.ru/)

The students are involved in the following:
- volunteering (arranging the Big Geographic Festival and the GeoCa Conference);
- Research work. Most students have experience as speakers at conferences.

Recommendations

Recommendations for the support of students in the period of training, in terms of e-learning, for example, were considered in the criteria above.

12. Career guidance. Assessment of the training quality of prospective students (for the Bachelor's Programme)
Criterion assessment: Excellent

Strong points of the programme:

Key career guidance events include open days, On-line presentations, and public lectures titled "The Many Faces of Geo"
4 open days are scheduled for the spring semester of 2018 (http://earth.spbu.ru/join/join-b/)

10 lectures within "The Many Faces of Geo" are scheduled for the spring semester of 2018 (http://earth.spbu.ru/join/multigeo/raspisanie-lektsiy-vesna-2018-goda.html)
A presentation of the Cartography and Geoinformatics took place on 1 December 2017

Recommendations*:*

The team should consider involving graduates as mentors to students and also used as support for upskilling teaching staff. This could be an additional innovative element added to what is already an outstanding programme.

CV OF THE EXPERT *(EXPERTS)*

Full name of an expert: Bilibina Natalia Andreyevna

Place of employment	State Federal-Funded Educational Institution of Higher Professional Training "Moscow state university of geodesy and cartography" (MSUoGaC)
Position	Associate professor of the department of MSUoGaC
Education	Higher
Academic degree and academic title	Candidate of Technical Sciences
Additional titles and degrees	Honored worker of higher education
Professional achievements	Author of more than 35 academic works The courses given "Mathematical cartography", "Cartography fundamentals", "Designing and mapping"
Research interests	Mathematical cartography, Designing and mapping
Practical experience in the field of the programme subject to assessment	Experience in teaching of cartographic disciplines - 35 years

Full name of an expert: Beresiuk Nikolai Igorevich

Place of employment	Federal state budgetary institution "A.P. Karpinsky Russian Geological Research Institute"
Position	The head of the educational consulting and methodological center on geoinformational technologies (GIS-center, A.P. Karpinsky Russian Geological Research Institute)
Education	Higher
Academic degree and academic title	no
Additional titles and degrees	
Professional achievements	
Research interests	Geoinformational systems in Geology
Practical experience in the field of the programme subject to assessment	15 years

Full name of an expert: Donert Karl

Place of employment	EUROGEO Association
Position	President

Education	Higher
Academic degree and academic title	no
Additional titles and degrees	
Professional achievements	
Research interests	Geoinformational systems in Geology, citizen science
Practical experience in the field of the programme subject to assessment	25 years

Full name of an expert: Pilieva Polina Davidovna

Place of employment	Student, "Moscow state university of geodesy and cartography" (MSUoGaC)
Position	
Education	
Academic degree and academic title	
Additional titles and degrees	
Professional achievements	
Research interests	
Practical experience in the field of the programme subject to assessment	