Decision Regarding Assessment of the Physical Sciences Study Programme Group at the Level of Doctoral Studies University of Tartu

20/06/2018

The Quality Assessment Council for Higher Education at the Estonian Quality Agency for Higher and Vocational Education decided to approve the report by the Assessment Committee and to conduct the next quality assessment of the Physical Sciences study programme group at the level of doctoral studies at the University of Tartu in seven years

On the basis of subsection 10 (4) of the Universities Act and point 40.1 of the 'Quality Assessment of Study Programme Groups at the Level of Doctoral Studies', authorised in points 3.7.3 and 3.7.1 of the Statutes of the Estonian Quality Agency for Higher and Vocational Education (hereinafter referred to as 'EKKA'), the EKKA Quality Assessment Council for Higher Education (hereinafter referred to as 'the Council') affirms the following:

1. On 30.03.2017 the University of Tartu and EKKA agreed upon a time frame to conduct a quality assessment of the study programme group.

2. The Director of EKKA, by her order on 22.02.2018, approved the following composition of the Quality Assessment Committee for the Physical Sciences study programme group at the level of doctoral studies at the University of Tartu, Tallinn University of Technology and Tallinn University (hereinafter referred to as 'the Committee'):

Robert William Munn	Chairman of the Committee, Consultant, Finchwood Academic, UK
Christian Enss	Professor, Heidelberg University (Germany)
Anna Geppert	Professor, Sorbonne University (France)
Lars Erik Holmer	Professor, Uppsala University (Sweden)
Juha Karhu	Professor, University of Helsinki (Finland)
Jürg Luterbacher	Professor, Justus Liebig University of Giessen (Germany)

Risto Nieminen	Professor, Aalto University (Finland)
Jakob Johansson	Doctoral student, Lund University (Sweden)

3. The University of Tartu submitted the following doctoral programmes for evaluation under the Physical Sciences study programme group:

Chemistry
Physics
Materials Science
Geography
Geology

4. The University of Tartu submitted a self-evaluation report to the EKKA Bureau on 24.01.2018, and the assessment coordinator forwarded it to the Committee on 9.02.2018.

5. An assessment visit to the University of Tartu took place on 24 and 25 April 2018.

6. The Committee sent its draft assessment report to the EKKA Bureau on 23.05.2018, and EKKA forwarded it to the University of Tartu for its comments on 25.05.2018 and the University delivered its response on 6.06.2018.

7. The Committee submitted its final assessment report to the EKKA Bureau on 6.06.2018. The assessment report is an integral part of the decision. The report is available on the EKKA website.

8. The Secretary of the Council forwarded the Committee's final assessment report along with the University's self-evaluation report to the Council members on 6.06.2018.

9. The Council with nine members present discussed these received documents in its session on 20.06.2018 and decided to highlight in the assessment report the following strengths, areas for improvement, and recommendations regarding the Physical Sciences study programme group at the level of doctoral studies at the University of Tartu.

The Committee highlighted for the Physical Sciences study programme groups at the University of Tartu, Tallinn University of Technology and Tallinn University the following common areas for improvement and recommendations:

1) The fact that the Estonian society and labour market do not highly value a doctoral degree is a challenge for the universities. Holding a doctoral degree has little influence on employment outside the academy. In some cases, it might even prove to be an obstacle. The universities should develop a joint plan for promoting the value of a doctoral degree outside the academic domain.
2) Today, the labs are well equipped, but there are no resources for sustaining or improving their level of quality since in a few years the European Union funds will no longer be available in the extent they are now. Universities should join forces to design mid-term and long-term measures for renewing the infrastructure.

3) An income equal to the average salary in Estonia shall be ensured for all doctoral students. It should mainly be done by increasing the state scholarship, but if this is not achievable, universities should supply it.
4) In the case of more ambitious projects, the period of doctoral studies tends to be extended. Besides having a principal supervisor, all doctoral students should have a co-supervisor in order to ensure that the required number of publications needed for defending the doctoral thesis is prepared during the four years foreseen for the studies.
5) Many doctoral students have a feeling that they are on their own. The universities should organise more activities that would enable doctoral students from various research teams to get better acquainted. Seminars with guest lecturers bringing students from different research teams together should be organised regularly.
6) The biggest obstacle in recruiting and maintaining international doctoral students is the lack of sufficient information available in English. The University's website has to provide better information in English, and the number of courses in English has to be higher to promote the admission of international doctoral applicants.
7) The volume of industrial practice is insufficient, and the same applies to the uptake of industrial doctorate programme opportunities. However, it would add value to a PhD degree outside academia and allow the universities to generate additional income from cooperation projects with enterprises. Universities should set up systematic measures that would give doctoral students an incentive to conduct a part of the doctoral thesis outside the University.
8) Teaching sometimes puts a significant burden to the doctoral students and being a supervisor to bachelor's or master's students halts their research work for weeks. However, doctoral studies should primarily focus on research and ensuring the continuity of research is a task of the head of the study programme.
9) According to an agreement between universities, three published articles is a precondition for defending one's doctoral thesis, which is more of a quantitative and not so much qualitative requirement. In their self-evaluation, the universities highlighted that the requirement of three articles is a problem for the more demanding projects that include extensive fieldwork. However, during the assessment visit, almost no one referred to it as an issue. The requirements set for publications should be more flexible and focused on their quality. Also, for longer projects, the payment of doctoral allowance should continue beyond the standard period.
10) For each doctoral thesis defended within the standard period of study, the supervisors receive a considerable one-time additional fee. The Assessment Committee finds that this practice should be reviewed since productively supervising a doctoral student should be one of the contractual obligations of supervisors.
11) All three universities have a doctoral programme in physics. At the same time, the teaching staff of these study programmes are relatively passive in developing the study programmes, seeing additional funding as the primary development need. Continuance of the doctoral programme in physics is of strategic importance, but the universities and relevant academic units need to outline a long-term vision for the development of doctoral studies and recruit new active teaching staff to implement it.

Strengths, areas for improvement and recommendations for the Physical Sciences group of programmes at the University of Tartu

CHEMISTRY

Strengths

1) Teaching staff are very experienced and active scientists with excellent publication results. They have extensive collaboration network both in Estonia and internationally.
2) Doctoral students can take part in the work of various research teams, which broadens their experiences and facilitates cooperation.
3) The University encourages the doctoral students to attend international conferences and the necessary support mechanisms are in place for that. This, in turn, encourages the internationalisation of research work.
4) Most of the doctoral students have no difficulties with the requirement of three articles.
5) The Institute of Chemistry has excellent resources for implementing PhD projects. Research labs are very well equipped, while the resources of other institutes can be exploited, too.
6) The Institute of Chemistry uses its financial means to ensure a doctoral allowance equal to the average salary in Estonia to all doctoral students.
7) Precise qualification requirements have been set for the supervisors for research work and prior results of supervising.
8) Doctoral students gain from taking part in the seminars of the doctoral school of functional materials and technologies.
9) Study plans for doctoral students are thorough and comprehensible.
10) Admission conditions have been modified to make competing for international students more productive.

Areas for improvement and recommendations

1) Although members from outside the University are involved in the Study Programme Council, no one of the employers and external partners representatives were aware of the Council's activity. Collecting feedback from alumni and employers should be organised more systematically, it should not be based on personal contacts only.
2) Several courses listed in the study programme have not been conducted in years due to the low number of students. The list of subjects in the study programme shall be feasible and allow for the doctoral students to plan their studies as well as acquire soft skills.
3) For developing professional knowledge and skills, more alternative options should be used, such as weekly journal review clubs where a member of the research team would present a new paper from a recently published research journal, followed by a discussion.
4) New technologies, including e-learning, shall be used more actively in conducting the courses.
5) All teaching staff should develop their teaching skills regularly, and these have to be evaluated, too, much like it is highlighted in the University's self-evaluation report.
6) Collaboration with the companies in the field has to be further developed, including through co-supervision of doctoral students.
7) The interviews and testing used in admitting international doctoral students shall be more thorough to assess the applicant's capability to pass the doctoral programme and thus reduce dropout and cases of an extended period of studying.
8) The annual evaluation shall be more interactive, include meaningful dialogue with the doctoral students and detailed feedback. Besides annual official evaluations, informal mid-term evaluations should be carried out.

PHYSICS; MATERIAL SCIENCE

Strengths

1) The University encourages the doctoral students to attend international conferences and the necessary support mechanisms are in place for that. This, in turn, encourages the internationalisation of research work and helps to make new contacts.
2) Besides having the excellent research and learning infrastructure of the Physicum at their disposal, doctoral students can also use other units of the University as well as those of Estonian and international partners.
3) The supervisors are highly qualified active scientists. The feedback from the doctoral students indicates that supervision is efficient. Researchers are also involved in teaching and supervision activities.
4) Admission conditions have been amended in a way to make cross-border competing for international students more effective.

Areas for improvement and recommendations

1) Several courses listed in the study programme have not been conducted in years due to the low number of students. The list of subjects in the study programme shall be feasible and allow for the doctoral students to plan their studies. The study information system should show the available courses in a longer term than just one year.
2) Although the study programme includes entrepreneurship practice, the doctoral students are not aware of this. Even if the work practice is not a compulsory element of the study programme, the doctoral students must be informed about the opportunity and encouraged to seize it.
3) To those doctoral students who lack basic knowledge in a particular area, a remedial course shall be provided. No credit points needed for the study programme should be rewarded for taking remedial courses.
4) Predominantly based on the needs of doctoral students from other universities (including foreign universities) all elective courses should carry adequate and precise names and be well described. For example, such subjects as Electrochemistry III and Surface Chemistry III presumably have two prerequisite courses that international students have not taken, and the names of the subjects fail to describe their contents.
5) Collecting feedback from alumni and employers should be organised more systematically, it should not be based on personal contacts only.
6) There are problems with the sustainability of infrastructure. There is a lack of lab technicians.
7) Greater collaboration with businesses and other external partners is necessary to increase the doctoral allowance.
8) According to the Committee, limiting the number of supervisees per supervisor is not the best solution since it leaves less choice for students.
9) The mere number of publications is a rather primitive indicator to use for research work, especially if the relative contribution of the doctoral student and the supervisor is disregarded.
10) For some doctoral students, the workload from teaching and supervising bachelor's and master's thesis is hefty, while others are not able to teach at all despite their wish to do so. The principle of equal treatment should be used in allocating the teaching load. All doctoral students should have an opportunity to teach because it is a perfect way to deeply understand a particular topic and to develop several general competences.
11) More international teaching staff should be involved in PhD seminars.
12) Various additional training opportunities shall be offered to the teaching staff to improve their teaching and supervising skills, and it shall be compulsory for them to undergo such training.

13) The interviews and testing used in admitting international doctoral students shall be more thorough to assess the capability of the applicants to pass doctoral programme and thus reduce dropout and cases of an extended period of studying.
14) The annual evaluation shall be more interactive, include meaningful dialogue with the doctoral students and detailed feedback. Besides annual official evaluations, informal mid-term evaluations should be carried out.
15) Alumni and employers cooperation networks should be set up to support the development of the study programme and doctoral students.

GEOGRAPHY

Strengths

1) The study programme is of high level, and all doctoral students are involved in the research teams of their supervisors. The doctoral students have excellent opportunities for finding co-supervisors from outside the University, and for mobility.
2) The study programme benefits from the wide-based setup and the internal collaboration of the Institute of Ecology and Earth Sciences, which allows the doctoral students to design a study plan according to their needs and to choose relevant subject courses.
3) Co-supervision by enterprises is used.
4) The publications of the doctoral students are of high level in terms of both quality and quantity.
5) The teaching staff is highly qualified, motivated and open to cooperation.
6) The research infrastructure of the Institute of Ecology and Earth Sciences is of very high level and equipped with necessary labs and field work technology.
7) The Department of Geography and the Institute of Ecology and Earth Sciences as a whole has proved to be successful in obtaining grants needed to develop the infrastructure.
8) Teaching and supervision work is distributed among the teaching staff in a balanced way.
9) The admission procedure is efficient, allowing for admit motivated applicants.
10) Graduation effectiveness is above the faculty's average.

Areas for improvement and recommendations

1) Practical training in companies varies depending on whether the doctoral students are interested in purely academic or more applied research. The principle of adopting practical training to the individual interests of the doctoral students should undoubtedly continue to be in use.
2) According to the feedback from doctoral students, developing critical thinking, methodology, entrepreneurship skills, legal knowledge, project management, teamwork, PR, IT and other, needs more attention in the study programme.
3) Resources and project management shall be supported by a functional unit at the university level.
4) Cooperation links with the private sector needs further development, e.g. for contractual research.
5) The feedback from reviewers of doctoral thesis indicates that the volume of the thesis is too high. This is further confirmed by the self-evaluation report, according to which the majority of doctoral students have 6-7 if not more publications. Therefore, the Assessment Committee disagrees with the need to extend the period of doctoral studies pointed out in the self-

evaluation report. The volume of doctoral thesis should be limited, and the doctoral students should be steered to complete their thesis after publishing three articles.
6) For doctoral students whose studies entail long-term field work, a doctoral allowance beyond the four years starting from their admission should be provided.
7) Teacher training in the field of new interactive methods should be provided for the teaching staff.
8) The number of doctoral students should be higher, in particular, more international doctoral students should be admitted.
9) More postdoctoral positions should be created in the Department.
10) Doctoral students should receive career counselling and advice on research funding opportunities.

GEOLOGY

Strengths

1) Supervisors are very experienced and active researchers.
2) Doctoral students benefit from international geo-information system training.
3) Integrating different institutes into an integrated Institute of Ecology and Earth Sciences has created additional opportunities for interdisciplinary research and PhD projects. The collaboration with the recently established Geological Survey of Estonia as well as with other research institutions and private companies is auspicious.
4) A high volume of external funding is an essential support for the study programme. For example, the Department has successfully used the Erasmus+ strategic partnership project "European Astrobiology Campus".
5) The laboratories are of high level, active collaboration with the University of Tartu Institute of Chemistry and the Natural History Museum is also invaluable.
6) Doctoral students are delighted with their working conditions and the opportunity to communicate with their supervisors daily and in a friendly atmosphere.
7) The Department of geology has extensive international contacts for collaboration. What is more, visiting professors contribute to creating an international environment.
8) Most of the doctoral students work at the centres of excellence.
9) The teaching staff is involved in the work of numerous non-profit and professional organisations in Estonia and abroad.
10) Thanks to extensive international contacts the doctoral students' mobility is very high.

Areas for improvement and recommendations

1) The number of international doctoral students has thus far been deficient and now dropped to zero. Recruiting international doctoral students requires continuous attention.
2) The study programme has to be more focused on the labour market. Teaching more transferable competencies is necessary for better employment of graduates outside the University.
3) An introductory course should be provided to new doctoral students. Also, organising regular seminars is necessary to allow the doctoral students and the teaching staff to discuss their research work.
4) Cooperation (e.g. joint doctoral projects, work practice) shall be developed with the Geological Survey of Estonia and other potential external partners, such as the Estonian Land Board.

5) The excellent infrastructure should be more actively used for commercial purposes.
6) All doctoral students shall have an opportunity to conduct teaching, and be remunerated for it.
7) In recruiting teaching staff not only their international scientific reputation but also teaching skills shall be taken into consideration. The teaching staff shall have an obligation to upgrade their teaching and supervising skills.
8) Younger teaching staff with no supervising experience should not be excluded on the grounds of research and prior supervision requirements set for supervisors.

10. Point 41 of the 'Quality Assessment of Study Programme Groups at the Level of Doctoral Studies' establishes that the Quality Assessment Council shall approve an assessment report within three months after receipt of the report. The Council shall weigh the strengths, areas for improvement, and recommendations outlined in the assessment report, and decide whether to conduct the next quality assessment of that study programme group in seven, five or three years.

11. The Council weighed the strengths, areas for improvement, and recommendations presented in point 9 of this document and found that the study programme, the teaching conducted under these programmes, and development activities regarding teaching and learning conform to the requirements, and

DECIDED

to approve the assessment report and to conduct the next quality assessment of the Physical Sciences study programme group at the level of doctoral studies at the University of Tartu in seven years.

The decision was adopted by nine votes in favour and 0 against.

12. The Council proposes that the University of Tartu will submit an action plan to EKKA concerning the areas for improvement and recommendations pointed out in the report no later than 20.06.2019.

13. A person who finds that his or her rights have been violated or his or her freedoms restricted by this decision may file a challenge with the EKKA Quality Assessment Council within 30 days after the person filing the challenge became or should have become aware of the contested finding.

The Council shall forward the challenge to its Appeals Committee who shall provide an unbiased opinion in writing regarding the validity of the challenge to the Council, within five days after receipt of the challenge. The Council shall resolve the challenge within ten days of its receipt, taking into account the reasoned opinion of the Appeals Committee. If the challenge needs to be investigated further, the deadline for its review by the Council may be extended by a maximum of thirty days.

A legal challenge to this decision is possible within 30 days after its delivery, by filing an action with the Tallinn courthouse of the Tallinn Administrative Court under the procedure provided for in the Code of Administrative Court Procedure.

Eve Eisenschmidt
Chair of the Council

Hillar Bauman
Secretary of the Council