

**Decision Regarding Assessment of the Engineering,  
Manufacturing and Technology Study Programme Group at  
the Level of Doctoral Studies  
University of Tartu**

**02/02/2018**

**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 doctoral studies in the Engineering, Manufacturing and Technology study programme group at 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 9.01.2017 University of Tartu and EKKA agreed upon a time frame to conduct the quality assessment of the study programme group.
2. The Director of EKKA, by her order of 28.08.2017, approved the following membership of the quality assessment committee for the quality assessment of the third cycle of higher education in the Engineering, Manufacturing and Technology study programme group at University of Tartu, Tallinn University of Technology and Estonian University of Life Sciences (hereinafter referred to as 'the Committee')

<b>Mark G Richardson</b>	<b>Chairman of the committee, Professor Emeritus; University College Dublin (Ireland)</b>
<b>Simo-Pekka Hannula</b>	Professor, Aalto University (Finland)
<b>Klaus Hellgardt</b>	Professor, Imperial College London (United Kingdom)
<b>Marios Kassinopoulos</b>	Professor, Cyprus University of Technology (Cyprus)
<b>Pille Meier</b>	Estonian Forest and Wood Industries Association, Theme leader for processing industry and education (Estonia)

<b>Henrik Persson</b>	PhD student, Lund University (Sweden)
<b>Jan-Eric Ståhl</b>	Professor, Lund University (Sweden)

3. University of Tartu submitted the following third cycle study programme for assessment in the Engineering, Manufacturing and Technology study programme group:

#### **Engineering and Technology (doctoral studies)**

4. University of Tartu submitted the self-analysis report to EKKA on 17.07.2017, which the assessment coordinator forwarded to the committee on 22.08.2017.
5. Assessment visit to University of Tartu took place on 17.10.2017.
6. The committee submitted the draft assessment report to EKKA on 9.12.2017, which was sent to the university for comments by EKKA on 9.12.2017 and to which University of Tartu delivered its response on 20.12.2017.
7. The Committee submitted its final assessment report to EKKA on 08.01.2018. 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 18.01.2018.
9. The Council with 8 members present discussed these received documents in its session on 2.02.2018 and, based on the assessment report, decided to point out the following strengths, areas of improvement, and recommendations regarding the Engineering, Manufacturing and Technology study programme group at the level of doctoral studies at University of Tartu

#### **General recommendations regarding the financing of research and doctoral studies**

- 1) The overall level of national funding for R&D in Estonia and the systematic negative consequences of the high fraction of competitively awarded funding for R&D, compared to baseline funding, lead to systemically detrimental consequences. The proportion of baseline and competitively awarded funding for R&D in universities needs to shift closer to 60%, rather than the current 30%. The portion of investment in R&D through the public university sector should be targeted at a level of 1% of GDP by 2020 through ring-fencing one third of R&D funding envisaged in the "Estonia 2020" competitiveness strategy.
- 2) The stipend paid to doctoral students is way below adequate compared to the cost of living. A culture has grown up of 'hobby Ph.D. students' - a situation whereby it is deemed acceptable for a Ph.D. student to be in full-time employment outside the university for economic reasons. These individuals are unable to engage in research to a required degree nor contribute to the life of the university community. The relatively low level of the value of the stipend is seen as a measure of the low value attaching to doctoral studies by Estonian society, with consequent problems in attracting and retaining the best students. Therefore it is recommended that annual state investment in university R&D be raised to at least 1% of GDP. Furthermore, it is also recommended that a portion of increased R&D investment be ring-fenced to bring the level of the state funded Ph.D. student stipend to a baseline figure of €1100 per month (replicating the

baseline figure already in place through top-up funding in at least one of the state universities) as soon as possible.

### **General areas for improvement and recommendations for the Engineering, Manufacturing and Technology Study Programme Group at the Level of Doctoral Studies at University of Tartu, Estonian University of Life Sciences and Tallinn University of Technology**

- 1) Those in full-time doctoral studies are sometimes tasked with significant teaching responsibilities as part of their financial top-up package. Their workload can become excessive and out of balance with that of a full-time research student with consequent impact on timely completion of studies.
- 2) Because a doctoral student's income is partly tied to a research grant, the research questions that form the core of their PhD study may fall outside the scope of the grant. This then deprives them of freedom to devote time and research resources to independent exploration of research hypotheses.
- 3) The recruitment practice of doctoral students lacks transparency, which can lead to universities potentially missing out on best-qualified candidates. It is recommended that each government funded PhD opportunity be marketed internationally in a timely manner with associated mandatory and desirable criteria specific to the research project. Candidates should be assessed by a departmental doctoral studies committee against the published criteria and places offered in a transparent manner with feedback available upon request to rejected applicants. In order to ensure equal opportunities for foreign applicants the recruitment cycle should be in line with the relevant international practice.
- 4) Career development of academic staff may be hindered by the situation whereby they cannot get on the ladder of winning research funding until they have a record of principal supervision of research students but they need to win funding before they are allocated principal supervision of doctoral students.
- 5) At present Estonian society and industry fail to see to a sufficient extent the added value of highly qualified researchers. It is recommended that university-industry interaction be enhanced through the establishment by engineering departments of Industry Advisory Boards involving representatives from the technology industry. Likewise it is recommended that public universities widely pilot Industrial Doctorates, based on the Danish model, with such PhD students spending approximately half of their time in the university and half in the industrial company.
- 6) The pace of internationalisation of the learning experience by PhD students is slow. In order to improve the international competitiveness of graduates, it is recommended that university managements conduct a review of barriers to internationalisation of the doctoral student experience leading to an action plan of proactive measures to promote an inclusive study environment for doctoral students. The aim of proposed measures should be to harness the integration of diverse cultures and varied prior graduate educational experience as an every-day part of a challenging and thought-provoking collegiate PhD study environment.
- 7) The sustainability of doctoral schools is potentially threatened by the end of EU funding. It is recommended that a review of the funding model be undertaken to ascertain the optimal model for ensuring sustainability of the doctoral school network, especially when European Regional Development Fund support ends.
- 8) In order to improve collaboration between universities participating in doctoral schools, the funding of joint activities of partner universities should take place on fair terms and conditions. Doctoral schools should be given the opportunity to devise joint courses that could be made

available to students from all participating universities. Adding an online learning component to cooperation would avoid the duplication in the use of scarce resources as well as ensuring critical mass of participants on specialized courses.

- 9) Transition to tenure track system may bring unforeseen consequences. In order to ensure equal development of supervision of doctoral students and research, doctoral studies in universities should be conducted under the supervision of academic staff with workloads that integrate education, research and innovation without the ability to opt out of time devoted to any one of these aspects of workload. Recruitment and promotion policies should reflect ability and performance under all above-mentioned aspects.
- 10) Opportunities posed by doctoral studies to develop a strong work and safety culture in Estonian industry are not being used to full effect. Formal assessment of doctoral students' skills and knowledge after safety briefings is recommended.

## **Supplementary strengths and areas for improvement of the Engineering, Manufacturing and Technology Study Programme Group at the Level of Doctoral Studies at University of Tartu**

### **Strengths**

- 1) High quality of infrastructure is in place to support Ph.D. studies, European Union development funds are successfully used for inter-institutional doctoral schools.
- 2) Regular self-evaluation of results and efficiency.
- 3) Support to build relations with industry and the labour market exists as well as help to improve skills in communication and popularization of science.
- 4) Measures for adding competence in teaching are defined and utilised.
- 5) The laboratories are well equipped with additional key core facilities – the proteomics core facility, the core facility for applied virology and the core facility for constructing scientific machines. These provide easy access to sophisticated technologies, thereby enhancing collaboration and external visibility through services sold abroad.
- 6) The Engineering and Technology doctoral studies research and learning environment is based in the Institute of Technology whose annual budget is 70% research related and the research infrastructure is founded on Institutes which have a track record in fundamental scientific research.
- 7) The continuity of financial support to maintain and develop the infrastructure that underpins high quality doctoral studies is assured through prudent financial management and discipline at all levels. University of Tartu is well positioned in respect of the national funding model involving baseline and performance-based metrics; there is significant equity capital available.
- 8) A patent application may be accepted in partial fulfilment of the submission requirements instead of one of the three papers.
- 9) The Institute of Technology is well organised and there is a close and collegiate relationship between all members of the Institute (professors, research associates and students). The workload is evenly distributed.
- 10) All supervisors have international experience.

- 11) PhD students collaborate on a number of projects, which in turn allows them to participate in the submission of papers as co-authors. This then reduces the individual burden of the requirement to publish three papers for their thesis.
- 12) The introduction of academic mentors, whose role is to aid students in the advancement of studies is laudable.
- 13) Student mobility is encouraged and supported. Doctoral students take part in mobility programmes, spending at least one semester studying abroad.

### Areas for improvement and recommendations

- 1) The average time to complete doctoral studies is relatively long given that the thesis may be submitted for defence after three papers are produced. It is recommended that actions to shorten study times are taken. These should involve benchmarking the best practices within Estonian Universities, organisation of student funding, sharing of work at the research group level and making sure that the PhD project remains as a doctoral project the student is responsible for, not only a part of supervisors' scientific work.
- 2) It is recommended that the coherence of the study programme is improved. Those modules, which are rarely if ever offered in practice should be identified and removed from the published list offerings where appropriate. The content and outputs of colleagues' work within the same study programme should be systematically reviewed and the modules offered rationalised with duplicated material removed from the study programme.
- 3) The funds available to support the stipend for each doctoral student are varied and thus lead to a complex financial support structure. This in turn means that there is no consensus regarding the structure of the overall student stipend. It may be useful to consider a standard student stipend commensurate and competitive to the basic average salary in Estonia.
- 4) The safety culture in general in the labs could be improved. This will mainly require investment into additional training and reporting such as annual Health and Safety testing – e.g. online, the implementation of activity risk assessments (documentation), development of documented SOPs (standard operating procedures), clear policy regarding lone working and good laboratory practice (wearing of lab coats, goggles, gloves etc.).
- 5) Modules not offered in English should be removed from the course offering. Additional offering of courses useful for non-academic careers e.g., in industry is recommended to be considered.
- 6) It is not always clear that the thesis is an independent research paper of the candidate as there is often multiple authors included from a large research group behind the paper. It is recommended that the thesis projects are designed in such a way that it is possible for the doctoral student to manage responsibility as a first author in at least three peer reviewed papers during the four-year time of the thesis project.
- 7) The induction of new staff is through initial co-supervision of PhD students. This very much amounts to learning-on-the-job and the supervisory skills acquired will depend on the respective skills of the senior colleague involved. It is recommended that this is decoupled somewhat in the sense that all prospective supervisors are given comprehensive training regarding supervision.
- 8) More options for topping up their teaching skills should be offered to teaching staff members.
- 9) In terms of publications an interesting conflict of interest was highlighted between the need of the PhD student to publish three papers in order to complete his/her studies and the desire of the supervisor to increase his/her international reputation and that of the Institution by publishing in high impact journals, thus requiring more data etc. before a significant piece of work can be released. As it is clear that in evaluation of research effectiveness priority is given to



international impact over quantity, the University should consider allowing for more flexible interpretation of the requirement of three papers.

10. Point 40 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 of 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 of 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 conduct the next quality assessment of the third cycle of studies in the Engineering, Manufacturing and Technology study programme group at University of Tartu in 7 years.**

The decision was adopted with 8 votes in favour. Against 0.

12. The Council proposes that University of Tartu submit an action plan to EKKA concerning the areas for improvement and recommendations pointed out in the report no later than 02.02.2019.
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.

**Tõnu Meidla**  
**Chair of the Council**

**Hillar Bauman**  
**Secretary of the Council**