

Decision Regarding Assessment of the Mathematics and Statistics Study Programme Group University of Tartu

29/09/2017

The Quality Assessment Council for Higher Education of 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 Mathematics and Statistics study programme group in the first and second cycles of higher education at the University of Tartu in seven years

On the basis of subsection 10 (4) of the Universities Act and point 41.1 of the document, 'Quality Assessment of Study Programme Groups in the First and Second Cycles of Higher Education', 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 9.03.2016 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 31.01.2017, approved the following membership of the quality assessment committee for the Mathematics and Statistics study programme group in the first and second cycles of higher education at the University of Tartu and Tallinn University (hereinafter referred to as 'the Committee'):

Ernst W. Mayr	Chair of the Committee, Professor, Technical University of Munich, Germany
Juha Kinnunen	Professor, Aalto University, Finland
Mats Boij	Professor, KTH Royal Institute of Technology, Sweden
Piret Raukas	Non-university expert, SEB Bank, Estonia
Philipp Schulz	Student, RWTH Aachen University, Germany

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

Mathematics (BSc)

Mathematical Statistics (BSc)

Mathematics and Mathematical Statistics (MSc)

Financial and Actuarial Mathematics (MSc, taught in English)

Financial Mathematics (MSc)

4. The University of Tartu submitted a self-evaluation report to the EKKA Bureau on 23.01.2017 and the assessment coordinator forwarded it to the Committee on 25.01.2017.
5. An assessment visit was made to the University of Tartu during 22–23.03.2017.
6. The Committee sent its draft assessment report to the EKKA Bureau on 5.06.2017, EKKA forwarded it to the University of Tartu for its comments on 6.06.2017 and the University delivered its response on 15.06.2017.
7. The Committee submitted its final assessment report to the EKKA Bureau on 22.06.2017. That assessment report is an integral part of the decision, and 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 25.08.2017.
9. The Council with 9 members present discussed these received documents in its session on 29.09.2017 and, based on the assessment report, decided to point out the following strengths, areas for improvement, and recommendations regarding the Mathematics and Statistics study programme group at the University of Tartu.

Strengths

- 1) Education in mathematics and statistics in Estonia is of high quality, and a very good learning environment has been created for students by means of the existing resources (teaching staff, infrastructure).
- 2) The study programmes in mathematics and statistics at the University of Tartu have a good reputation. The overall satisfaction with the programmes by students, alumni and employers is very high. Stakeholders are generally very satisfied with graduates, and employers are particularly appreciative of their logical thinking skills. Graduates are in demand in the labour market.
- 3) The Institute of Mathematics and Statistics at the University of Tartu has good infrastructure and learning facilities. Students have access to sufficient learning resources, supporting the achievement of objectives of the study programmes. A broad selection of e-libraries has been made available for students and staff.
- 4) The University appreciates its students' feedback and has developed a very good system for collecting their feedback, and is also working at an advanced feedback system. As a result, students feel that their feedback matters.
- 5) First-year students are offered special support to ease their transition from secondary school studies to university studies.
- 6) The study programmes support the students' ability to attach meaning to data, as well as to understand and interpret it.
- 7) The BSc programmes contain practical training periods of at least four weeks. Practical training is also an important part of the Financial and Actuarial Mathematics programme.
- 8) Members of the teaching staff in the programmes have good relationships with enterprises (e.g. Swedbank), which may, inter alia, improve the Institute's financial situation in the future.
- 9) E-learning and modern teaching methods are used in many study programmes.
- 10) High standards have been set for the study programmes. During their studies students acquire the skill of mathematical thinking and ICT skills. More challenging assignments are offered to students who are more talented, and support is offered to those who lag behind.
- 11) Learning outcomes are clearly oriented toward the needs of the labour market. Additional practical aspects have been included in the programmes over the years, and there is very good

balance between theoretical and practical studies. The Financial and Actuarial Mathematics programme uses the International Actuarial Association's (IAA) standards.

- 12) Good practices in learning and teaching are shared at regular 'From Teacher to Teacher' meetings. Staff members are interested in enhancing their pedagogical skills.
- 13) The quality levels of MSc theses are very high. Graduates receive very good preparation for doctoral studies.
- 14) Graduates of BSc programmes already have good employment prospects, but the Master's degree is seen by both students and employers as a serious advantage in the labour market.
- 15) The number of students admitted to BSc studies has no longer been decreasing during the last few years, as the University has done a commendable job in promoting the study programmes among secondary school students.
- 16) There is close interaction between students and staff members; direct personal support is available to the students.
- 17) Support is provided to students wanting to study abroad regarding organisational matters, and with the transfer of ECTS credits earned abroad.

Areas for improvement and recommendations

- 1) The number of students in the study programme group has dropped from 233 to 169 in the last five years. A further decrease in the number of learners in mathematics and statistics programmes is a concern that should be addressed at the national level. The problem is highlighted by the fact that graduates of this particular discipline are actually in great demand in the labour market.
- 2) International cooperation should be enhanced, including international mobility for both students and teaching staff. Since only a very small number of students currently indicate a desire to participate in mobility schemes, the available exchange opportunities should be better communicated to them. With regard to international student and staff mobility, the Institute could pursue closer international cooperation with other universities, such as universities in the Baltic and Nordic countries.
- 3) Benchmarking of the contents and standards of the study programmes against recognised universities in Europe is recommended.
- 4) The logical sequences of courses in the BSc and MSc studies should be better explained to the students. Changes in the courses should be better coordinated with one another.
- 5) More case studies could be used in the Mathematical Statistics MSc programme, and more courses on biostatistics and big data could be included in the programme.
- 6) Low salary levels of the teaching staff make it difficult to recruit international lecturers. Competition for positions at the University is quite weak.
- 7) The number of ECTS credits should be more in line with work done by students. Student workloads for independent work should be increased.
- 8) Modern methods of teaching should be used more extensively to reduce the fairly high dropout rates and to attract more students to the programmes.
- 9) According to employers, the communication and project-oriented working skills of graduates could be improved, by giving them more complex assignments and by applying communication-oriented examination methods.
- 10) The Financial Mathematics and the Financial and Actuarial Mathematics programmes could offer short-term practical training opportunities for staff members at companies in the region, to ensure that they keep abreast of modern terminology and methods.
- 11) Students should be ensured remote access to the University's computer network from outside of the campus. Students should also be allowed access to ICT tools and software when outside of the University; for example, the University should obtain the necessary licenses. E-learning

opportunities should be used in teaching and learning in a more systematic and effective manner.

- 12) Student representatives could also participate in the 'From Teacher to Teacher' meetings.
 - 13) The mechanisms for 'collegial feedback' should be further strengthened, in particular in the light of the fact that many courses have been taught by the same lecturer for five or more years. In some cases, teaching methods used could be reviewed and adapted.
- 10.** Point 41 of the document, 'Quality Assessment of Study Programme Groups in the First and Second Cycles of Higher Education', 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 pointed out in the assessment report, and then shall 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 referred to in point 9 of this document and found that the study programmes, 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 Mathematics and Statistics study programme group in the first and second cycles of higher education at the University of Tartu in seven years.

The decision was adopted by 9 votes in favour and 0 against.

12. The Bureau of EKKA will coordinate a date for the next quality assessment of the study programme group with the University of Tartu no later than 29.09.2023.
13. The Council proposes that the University of Tartu will submit an action plan to EKKA with regard to the areas for improvement and recommendations pointed out in the report no later than 29.09.2018.
14. 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. A judicial 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 pursuant to the procedure provided for in the Code of Administrative Court Procedure.

Maaja-Katrin Kerem
Vice-Chair of the Council

Hillar Bauman
Secretary of the Council