ESTONIAN QUALITY AGENCY
FOR HIGHER AND VOCATIONAL EDUCATION

Assessment Report on Meeting the Requirements of the Secondary Condition

Study programme group of Architecture and Building

Estonian University of Life Sciences

October 2019

Contents

Introduction

Background and aim of the assessment

Quality assessment of a study programme group involves the assessment of the conformity of study programmes and the studies and development activities that take place on their basis to legislation, national and international standards and developmental directions with the purpose of providing recommendations to improve the quality of studies.

The goal of quality assessment of a study programme group is supporting the internal evaluation and self-development of the institution of higher education. Quality assessment of study programme groups is not followed by sanctions: expert assessments should be considered recommendations.

Quality assessment of a study programme group takes place at least once every 7 years based on the regulation approved by EKKA Quality Assessment Council for Higher Education *Quality Assessment of Study Programme Groups in the First and Second Cycles of Higher Education.*

In 2017, an international expert panel assessed the quality of the study programme group of Architecture and Building at the Estonian University of Life Sciences. As a result, EKKA Quality Assessment Council for Higher Education decided at its meeting on June 12, 2017, that the next assessment is to take place in seven years if the universities meets certain requirements set by the Council.

The aim of the current assessment was to evaluate whether the requirements (secondary condition) set by the Quality Assessment Council for Higher Education have been met by the Estonian University of Life Sciences (EULS).

Assessor

EKKA invited Prof. Emeritus Mark Richardson, Chartered Engineer, University College Dublin, to assess progress on the secondary condition.

Assessment process

EULS sent their report on fulfilment of the secondary conditions to EKKA on June 12, 2019. A further submission was received in October 2019 in response to the Assessor's consideration of the June 2019 Progress Report.

This report is written based on the written materials presented by the EULS.

The current report is a public document and made available on EKKA website after EKKA quality assessment Council has made its decision.

1. Report on meeting the requirements of the secondary condition, Estonian University of Life Sciences

1.1 General background

At its meeting on June 12, 2017, EKKA Quality Assessment Council for Higher Education decided that the next assessment of the study programme group of Architecture and Building at the Estonian University of Life Sciences will take place in 7 years (maximum term) but set a secondary condition that the EULS should meet in 2 years.

Based on the Assessment Report of the international panel and the Decision of EKKA Quality Assessment Council for Higher Education, the EULS submitted the following document to EKKA:

1) Architecture and Building Study Programme Group. Progress Report

1.2 Meeting the requirements of secondary condition

The following are the requirements set by the Quality Assessment Council to be met by the EULS, and the committee's assessment on the developments EULS has made in this regard.

Subsection 6 (3) of the Government of the Republic Regulation, 'Standard of the Higher Education', prescribes that the objectives and learning outcomes of a study programme shall meet the requirements and trends of international legal instruments that regulate the professional field. The Civil Engineering (Rural Building) study programme is not entirely in accord with international minimum requirements for civil engineers – for example, the study programme does not give enough emphasis to geotechnical engineering or construction of infrastructure (bridges and tunnels). The institute should review the study programme and separately itemise the objectives and learning outcomes regarding the fields of civil engineering and rural building.
Assessment of the committee: the secondary condition is fully met

Comments

The June 2019 Progress report from the University indicated that learning outcomes are being reviewed. The supplementary documentation provided by EULS in October 2019 provided detail on the specific changes implemented in

response to the secondary conditions. This provided clear evidence on changes made that fully take account of international benchmarking on the one hand, and consideration of the unique demands in professional practice that may be placed on a 'rural building' engineer, requiring a high level of knowledge of other sub-speciality fields as necessary.

In framing this assessment, the assessor has considered a number of points including international benchmarking, national government regulations, the national standard of qualification and the likely operational environment of a 'rural building' civil engineer.

The Bologna Declaration, signed by government ministers of 29 European countries in 1999 and adopted by Estonia in 2002, led to what has become known as the Bologna Process. This process, to ensure comparability in the standards and quality of higher education qualifications throughout the European higher education sector, has enhanced international recognition of qualifications awarded by European universities. The professional qualification for the Estonian Diploma Civil Engineer in Buildings and Structures, level 7 high education qualification is benchmarked to the European Qualifications Framework Level 7. In Estonian professional practice the holder of an appropriate master's degree may apply for the Diploma Civil Engineer in Buildings and Structures after two to three years of supervised engineering practice. Thus the educational requirement of the professional engineer equates to a very high standard, at master's degree level which, by way of comparison, is the educational requirement for those aspiring to eventual chartered engineer membership of some European professional engineering bodies.

In respect of international benchmarking, the assessor has been mindful of the goal that mobility in the European Union market should allow suitably qualified graduates of the EULS study programme Civil Engineering (Rural Building) to readily work outside Estonia and for graduates practising in Estonia to attract design work to their Estonian base, even if the project itself is in another European Union country. The assessor has used this assumption as the basis for the secondary condition deriving from the comment 'not entirely in accord with international minimum requirements for civil engineers work' even if national minimum standards are met. The question arises for example: what would be the learning outcomes required to achieve the EUR-ACE label of the European Network for Accreditation of Engineering Education?

Both the Universities Act 1995, as amended, and the standard of higher education in Estonia, set out in Government of Republic Regulation No.178 of 18 December 2008, includes reference to the framework requirements applying to training and studies in fields including architectural and civil engineering studies. The Regulation sets out uniform requirements for studies, including that master's level study at the second cycle of higher education includes acquiring the knowledge and skills necessary for independent work. The Regulation defines learning outcomes as knowledge, skills and attitudes described at the minimum level necessary for completion of the described study programme. In respect of learning outcomes relevant to independent work the Regulation states that master's degree graduates should be able to independently and creatively

identify and formulate problems related to the field of study and be able to solve them with appropriate measures within given timeframes and within limited information, using knowledge of other fields as necessary. This ability is particularly important to a Civil Engineering (Rural Building) graduate, given the variety of work involved in a rural environment on projects of a relatively small scale that may only provide financial support for a very limited engineering team. That 'team' might even be just one person on occasion. In this scenario, the engineer needs competence beyond the minimum in geotechnics and structural design. This sets a standard beyond the minimum for the educational formation of such an engineer.

The Estonian Qualifications Authority 'Standard of Qualification' states the requirements for competence in respect of the Diploma Engineer in specialities and sub-specialities. The EULS Civil Engineering (Rural Building) study programme is aligned to the speciality of 'Engineering of Buildings and Structures' and the sub-speciality of 'Building Design and Construction'. However the study programme in EULS is also unique in providing courses to provide the knowledge and skills specific to designing and building infrastructure for the agricultural production environment. Referring to the later expectations on such graduates the 'Standard of Qualification' refers to Level 7 Diploma Engineers working "independently in difficult and unforeseeable situations" and executing design conceptions considering, inter alia, "financial, ecological, job safety" aspects. This particularly raises the issue of competence by a EULS Civil Engineering (Rural Building) graduate in recognising where geotechnical considerations of a building project are within or outside their skillset. The starting point for developing this competence must be during the latter stages of the master's level study, as each individual's engineering experience prior to obtaining the Level 7 Diploma will be unique.

The 'Standard of Qualification' document makes clear that competence in geotechnics is expected of 'Building Design and Construction' graduates given that they may be involved in projects up to 5m below ground level and design, construction and owner supervision of structures of up to EVS-EN 1997-1 Category 2 geotechnical works. Thus they must have a high level of competence in geotechnics covering all such works except specialist Geotechnical Category 3 works. Category 3 relates to very large structures on unusual or exceptionally difficult ground conditions. Again, the importance of developing the fundamental knowledge for this competence during the master's level study is clear.

Equally it may be anticipated that 'rural building' engineers would be involved in small span bridges – perhaps as culverts or small tunnels - on private farmlands given that the 'Standard of Qualification' document permits involvement in projects involving precast concrete elements up to 25m in span where structures are subject to regular static and dynamic loading. Spanning small rivers on private roads would involve precast structures of considerably less than 25m in span and it would not be unreasonable to expect the Civil Engineering (Rural Building) graduate to have to face the task on occasion of, for example, designing and supervising construction of a replacement or refurbished structure. The documentation submitted by EULS indicates that the learning outcomes for core

courses addressing these needs have been suitably revised. Furthermore, elective studies are now offered for those wishing to deepen their knowledge in this field.

The skill set of a Civil Engineering (Rural Building) graduate is wide when categorised according to the sub-speciality of 'Building Design and Construction', notwithstanding that parallel sub-specialities exist for 'Geotechnical Engineering' and 'Bridge Engineering'. It is inevitable that the Civil Engineering (Rural Building) graduate will be faced with rural engineering challenges of foundations for farm buildings, small embankments, short span bridges and culverts. In such situations the size of the project and the budget for the works are unlikely to routinely allow for specialist involvement of geotechnical engineers and bridge engineers. The Civil Engineering (Rural Building) study programme must therefore equip the graduates with the knowledge of other fields as necessary so that they can recognise when they are working within their competence and especially recognise when specialist assistance should be called in. The 'Standard of Qualification' expects the holders of the Diploma of Civil Engineer of Buildings and Constructions to be equipped to "work alone in situations that are difficult, unforeseeable or of a kind that requires innovative approach. Takes the responsibility for the work outcome of himself and of his team, as well". It bears restating that the starting point for developing this competence in respect of geotechnical and structural engineering challenges must be during the latter stages of the master's level study, as each individual's engineering experience prior to obtaining the Level 7 Diploma will be unique and dependent of the projects encountered.

Every building project involves some level of geotechnics. In the evaluation of the EULS study programme the international expert team drew attention to the importance of all civil engineering students having experience of geotechnics. The subject cannot be viewed as solely theoretical and therefore the teaching of the subject requires adequate laboratory facilities where the students can gain experience that will support them in practice. The international expert team were surprised that adequate facilities were not evident at the time of their visit. It is clear from the detailed supplementary information provided by EULS in October 2019 that adequate facilities are in place.

Appendix 3 of the Estonian Qualifications Authority 'Standard of Qualification' document for Diploma engineers for Building Design and Construction provides a detailed indication of the scope of activity expected of graduates through a combination of formal education and experience. Regarding competence in geotechnics these include:

- Calculations and dimensioning of the surface below the construction and foundation, including pile width.
- Comparing real subgrading conditions to the soil data or the data acquired from geotechnical investigations that had been used when composing the construction project.
- Supervision of covered works and parts of construction, checking the compliance with the construction project and documentation.
- Supervision of covered works and parts of construction and composing corresponding acts.

Appendix 5 of the Estonian Qualifications Authority 'Standard of Qualification' document for Diploma engineers provides minimal requirements for knowledge and skills. Regarding the field of construction, it sets out minimal requirements for geotechnics. Seven points are listed of which only 3 are exclusive to the sub-speciality of geotechnical engineering. Among the other four general points is:

- Knows the characteristics of main soil types and knows what are the possibilities of defining them.

This is best taught through a combination of lectures supported by hands-on practicals in a geotechnics laboratory.

Regarding the operational environment of a 'rural building' civil engineer, it is likely that it will encompass situations where the engineer is working independently more often than a civil engineer working for a design consultancy in an urban setting. Thus the 'rural building' civil engineer must gain an integrated first and second cycle higher education that allows them to be expert in their specialisation while having familiarity with certain aspects of other sub-specialities. This would ensure that they can operate competently using knowledge of other fields as necessary and importantly to recognise when specialist engineering input needs to be brought in on a project under their direction.

EULS has a strong international reputation in the field of education for agriculture and forestry. It is also using the opportunity to set international standards for the educational formation of civil engineering 'rural engineers' supporting the rural economy and society, through unique courses in Estonia such as MI.1773 'Design of rural buildings' and 1850 'Agricultural buildings'. The EULS response to Deficiency No.1 has responded fully and positively to the intent of the secondary condition and stronger evidence of such a response will be progressively rolled out as curriculum revisions take effect in the current and future academic years.

Commendations

- Particular actions have been taken to strengthen the skills in Geotechnics through a new e-learning course, an added course paper in MI.1842 Geotechnics in respect of foundation loading, settlement of shallow foundations and further detail on pile foundation systems.
- The practical learning in Geotechnics has been updated.
- The learning outcomes in the MI.0621 Applied Geology course have been revised. (This course already included geotechnical material including soil data and characteristics of main soil types).
- Capacity to further develop learning in Geotechnics has been enhanced through additional laboratory equipment capacity and through software.
- Three particular actions have been taken to strengthen the skills in infrastructure.
- The learning outcomes in MI.0479 Special structures have been revised and the course content enlarged on bridges and tunnels.

- A new course MI.1942 Bridges has been added to the curriculum of the Civil Engineering (Rural Building) study programme.
- Students of the Civil Engineering (Rural Building) study programme may now take as an elective the course MI.0349 Hydraulic Structures I (including dams, channels, culverts).
- The current review of the curriculum is being addressed in the context of the decision of the evaluation committee at the learning outcome level.

Further considerations

- The University recognise that curriculum review is an ongoing process and that change is a slow process. Nevertheless changes relevant to this assessment are already in train for study year 2020/2021 and future years.

According to clause 6 (7) 3) of the 'Standard of Higher Education', the conduct of studies conforms to the requirements if ordinary teaching staff have regularly furthered their pedagogical skills. With regard to the Civil Engineering and the Hydraulic Engineering and Water Pollution Control study programmes, the teaching staff members are not engaged in regular development of their teaching skills. Lecturers should be trained to use active learning methods. It is recommended that a strategic plan be developed for future recruitments.
Assessment of the committee: the secondary condition is fully met

Comments

Specific plans have been developed and are being implemented in respect of the development of staff pedagogical skills. These take full advantage of both University-wide resources (teaching seminars and an educational technologist), and engineering resources (in the framework of the ASTRA project).

There is strong evidence in the Progress Report that the development of skills in respect of an ever-changing teaching and learning environment is addressing the challenges and opportunities of e-learning and the use of digital devices in innovative teaching methods.

Commendations

- Lecturers are being supported through the ASTRA project in developing their resources for e-learning, active learning and other innovative methods. The next iteration of the University's Studies Information System is moving to the Moodle environment, which is encouraging engagement with state-of-the-art e-learning resources by staff at both beginners and advanced level.

- External expertise in continuing education for advanced users of computer-aided design tools has been procured through public tender to upskill four lecturers.
- Lecturers are creating e-courses based on best practice, through e-learning guides prepared for them by the University's educational technologist.
- The Chair has committed (May 2019) to provide the resources that will ensure that each full time lecturer can improve their pedagogical skills at least once in every evaluation period.

Further considerations

- The University is currently in the process of changing the system of academic appointments. Further to recent legislation, a career model is being developed at the University that includes a tenure system This should help ensure that current positive developments will be sustainable.

If the University wishes to encourage both outgoing and incoming international mobility, it will be essential to include more courses taught in English in the study programmes, involve more English-speaking international lecturers, improve language proficiency of the core staff and also prepare the University for internationalisation in a cultural and organisational sense.
Assessment of the committee: the secondary condition is substantially met

Comments

The number of foreign lecturers involved is increasing according to a planned strategy. Opportunities for staff to develop their language skills are offered at a range of levels. There is a credit bearing (1 ECTS) module for students to better inform themselves of international study opportunities. This will be supplemented by a module to be offered in 2019/2020 that includes Intercultural Communication.

Three courses will be delivered in English in study year 2019/2020.

It is clear that efforts are being sustained to encourage outgoing international mobility by the students. Less evident are measures to increase inward international student mobility, other than the modest increase in the number of courses taught in English.

Commendations

- A university-wide module is being introduced in spring semester of 2019/2020 for developing social competence that includes Intercultural Communication. A seminar for staff with similar content will precede the student module.
- A staff member was selected from an open public competition to deliver a course in English on structural engineering at the Latvia University of Life Sciences and Technologies

Further considerations

- The growth in the number of courses taught in English in the study programmes is modest but the progressive enhancement of the English language proficiency of the academic staff represents an important building block on this journey.