

Assessment panel report

Bachelor Programme in Construction Engineering

Uppsala University

1. Introductory summary

In this summary, the panel presents the strengths and weaknesses found and identifies areas of development/improvement. The programme was assessed according to the Uppsala University guidelines - Model for Educational Evaluations at the Undergraduate and Graduate Level – Faculty of Science and Technology (TEKNAT 2017/85).

The Bachelor Programme in Construction Engineering has described its ambitions in the Self Evaluation 2018 document Dnr 2017/85 dated 2018-09-01.

Strengths:

- Graduates completing the bachelor programme are desired by industry.
- The connection to industry is strong given that several teachers are drawn from industry and students quickly find placement in industry after graduation.
- The programme has been set up in a manner that students build skills and competences gradually during the duration of the programme.
- The implementation of project courses in the programme is a positive trend given the need to develop appropriate competencies and skills. Students can apply the knowledge gained in fundamental courses in the project courses and in so doing, further develop relevant competencies and skills need to prepare them for the world of work.
- Large amounts of data are collected regarding student experiences and several discussion forums held to discuss the same. This provides useful data for overall improvement of the programme.

Weaknesses:

- The limited capacity of permanent staff provides a hurdle for overall improvement of the curriculum and study programme.
- While the idea of implementing project courses is good, there appears to be a lack of integration and coordination in the project course.
- The implementation of curriculum change can be improved. It seems that this has to do with a lack of clarity on decision-making and responsibility for change. Formally, responsibilities are laid down in the “Rules of Procedure for the Disciplinary Domain of Science and Technology.” However, the programme coordinator seems to be dependent on the departments to implement changes, which hampers the development of curriculum change and stunts any further growth of the programme.
- While collecting large amounts of data is positive, it is unclear what is being done with the data and how this is being used for positive curriculum change.
- There is an absence of a strong vision on developing an engineer of the future given the need to develop 21st century skills and competencies.
- There is no reflection on Outlook and Viability for the future. This makes it difficult to gauge the viability of the programme in the short- and medium-term.

Other points to note:

- Criteria for the assessment BSc thesis project have been defined. However, they could be formulated clearer and more specifically. Moreover, it would be valuable to present these to the students explicitly at the beginning of the project. This is important given that it is the last opportunity to check whether the appropriate Programme Intended Learning Outcomes (PILO's) are met and whether students are indeed ready for the world of work.
- The Self Evaluation Report (SER) does not speak to how the PILO's have been defined and how they are assessed.
- While there is a desire to integrate research into the curriculum, there appears to be a distinct lack of integration of research in the programme.

1.1 Quality enhancing measures

The most important quality enhancing measures in order to address the weaknesses mentioned in the Introductory Summary are given below:

- There is a need to increase the capacity of permanent staff, particularly people with expertise in multidisciplinary projects and project-based education are needed to be able to develop students that have 21st century skills and competencies.
- One teacher needs to take responsibility for the project course as a whole and for the integration/coordination of the different elements in the course. There is a need to set up an integrated assessment method/rubric for the project course to enhance integration within the project.
- The programme board needs to develop a vision on the development of the engineer of the future and what this means for developing engineers with appropriate skills and competencies.
- There is a need to develop a vision and mission for the programme in the future that considers an Outlook and aspects of Viability.
- Formally, responsibilities for decision-making on curriculum change for example are laid down in the "Rules of Procedure for the Disciplinary Domain of Science and Technology." However, we noticed a lack of power for the programme coordinator to implement curriculum changes for the programme. The implementation of decisions and thereby the success of intended changes needs to be less dependent on decisions of individual departments / teachers.
- Good data is routinely gathered. However, there is a need to set up a process of what to do with all the valuable evaluation data that is collected and make sure that someone has the power to implement recommendations that come out of it, such that it can lead to positive curriculum change.
- We recommend the university to develop and implement a system in which the programme management formally addresses aspects that are rated poorly by students. Staff should be held accountable for responding to these issues in a formal manner i.e. what, when and most importantly, how they plan to address the issues. This system could take the form of a typical "Plan-Do-Check-Act (PDCA)" cycle and could be fitted to the Quality Assurance system of the university.
- There is a need to develop objective assessment criteria for the BSc thesis project (rubrics) so that assessment of the PILO's are rounded off appropriately at the end of the programme.
- In order to improve the overall curriculum (and for the sake of transparency and reflection), a document needs to be composed in which the PILO's have been defined, how they are assessed and how they are used to evaluate/improve the curriculum

- The department responsible for the course needs to develop methods to better incorporate and integrate research in the programme.

2. Background

2.1 Evaluated education

Bachelor Programme in Construction Engineering
Programme coordinator: Ms. Petra Pertoft

2.1 Mission

The evaluation panel was asked by Uppsala University to evaluate the Bachelor Programme in Construction Engineering. The mission of the evaluation panel was to obtain thorough insight in the programme, compare this to our own insights and experiences with programmes in the field of Construction Engineering, to identify the strengths and weaknesses of the programme and to provide the University of Uppsala with recommendations to improve the weaknesses. In evaluating the programme, we had the following aspects in mind: i) the Programme Intended Learning Outcomes, ii) the Teaching and Learning environment and facilities, iii) the assessment of the intended learning outcomes, iv) the output of the programme (in terms of qualified graduates) and v) the quality assurance system of the programme. As a side-effect, part of our mission was to learn from the experiences of Uppsala University for our own programmes, both on teaching and learning in higher education in general, as well as on higher education in the field of Construction Engineering.

2.2 The evaluation panel's composition.

- Dr. C.M. (Marjolein) Dohmen-Janssen, Vice-dean for Education, Engineering Technology, University of Twente, The Netherlands
- Dr. S.R. (Seirgei) Miller, Programme Director Civil Engineering, University of Twente, The Netherlands
- Prof. dr. A.G (André) Dorée, Professor Market- & Organisational Dynamics in Construction Industry & Head of Construction Management and Engineering group, University of Twente, The Netherlands

2.3 Implementation

The University of Twente's Civil Engineering Department (Construction Management group) received the request to assess Uppsala University's Bachelor Programme in Construction Engineering. The objective of the programme assessment process was to assess whether the programme would conform to the standards as described in the Model for Educational Evaluations at the Undergraduate and Graduate Level – Faculty of Science and Technology (TEKNAT 2017/85). The evaluation structure followed the benchmarking model as described in the aforementioned document.

The panel chair and two other assessors drawn from the Construction Management group were sent the Self-evaluation report in advance of Uppsala university's visit to the University of Twente. The three assessors read the self-evaluation report in preparation of the visit. Several additional questions related to the self-evaluation report and a proposed site visit schedule were sent to the

Programme Coordinator before the visit.

Students and staff of the bachelor programme of Uppsala University visited the University of Twente on the 6th and 7th December 2018. During the visit we had several meetings with the visiting students and staff. They explained the Bachelor programme to us, we described our educational programmes and sufficient time was provided for us to ask questions and discuss the self-evaluation report and the bachelor programme itself. In addition, the staff of Uppsala had several meetings with our students, teachers and support staff (see Appendix 1 for a programme of the visit).

3. Summary

In summary, we conclude that the University of Uppsala offers a valuable Bachelor Programme in Construction Engineering which is appreciated by industry. The connection to industry is strong given that several teachers are drawn from industry and students quickly find placement in industry after graduation. While there is a desire to integrate research into the curriculum, there appears to be a distinct lack of integration of research in the programme. Also, the Self Evaluation Report (SER) does not speak to how the Programme Intended Learning Outcomes (PILO's) have been defined and how they are assessed.

The programme has been set up in a manner that students build skills and competences gradually during the duration of the programme. The programme started to implement project courses, which we consider a positive trend given the need to develop appropriate competencies and skills. Students can apply the knowledge gained in fundamental courses in the project courses and in so doing, further develop relevant competencies and skills need to prepare them for the world of work. However, there appears to be a lack of integration and coordination in the project course. Criteria for the assessment BSc thesis project have been defined. However, they could be formulated clearer and more specifically. Moreover it would be valuable to present these to the students explicitly at the beginning of the project. This is important given that it is the last opportunity to check whether the appropriate Programme Intended Learning Outcomes (PILO's) are met and whether students are indeed ready for the world of work.

The limited capacity of permanent staff provides a serious hurdle for overall improvement of the curriculum and study programme. The idea of implementing project courses is good. However, the implementation of such a curriculum change can be improved. It seems that this has to do with a lack of clarity on decision-making and responsibility for change. Although responsibilities are formally arranged, the programme coordinator seems to be dependent on the departments to implement changes, which hampers the development of curriculum change and stunts any further growth of the programme.

There is an absence of a strong vision on developing an engineer of the future given the need to develop 21st century skills and competencies. Also, there is no reflection on Outlook and Viability for the future. This makes it difficult to gauge the viability of the programme in the short- and medium-term.

Large amounts of data are collected regarding student experiences and several discussion forums held to discuss the same. This provides useful data for overall improvement of the programme. This is very positive. However, it is unclear what is being done with the data and how this is being used for positive curriculum change.

We have the following recommendations to address the weaknesses of the programme:

- There is a need to increase the capacity of permanent staff, particularly people with expertise in multidisciplinary projects and project-based education are needed to be able to develop students that have 21st century skills and competencies.
- One teacher needs to take responsibility for the project course as a whole and for the integration/coordination of the different elements in the course. There is a need to set up an integrated assessment method/rubric for the project course to enhance integration within the project.
- The department needs to develop a vision on the development of the engineer of the future and what this means for developing engineers with appropriate skills and competencies.
- There is a need to develop a vision and mission for the programme in the future that considers an Outlook and aspects of Viability.
- Given the lack of clarity on decision-making and responsibility, there is an urgent need to give someone (perhaps a programme coordinator) more power to make curriculum and other related, forward-looking decisions for the programme. The success or otherwise of the programme needs to be less dependent on decisions of individual departments / teachers.
- Good data is routinely gathered. However, there is a need to set up a process of what to do with all the valuable evaluation data that is collected and make sure that someone has the power to implement recommendations that come out of it, such that it can lead to positive curriculum change.
- We recommend the university to develop and implement a system in which the programme management formally addresses aspects that are rated poorly by students. Staff should be held accountable for responding to these issues in a formal manner i.e. what, when and most importantly, how they plan to address the issues. This system could take the form of a typical “Plan-Do-Check-Act (PDCA)” cycle and could be fitted to the Quality Assurance system of the university.
- There is a need to develop objective assessment criteria for the BSc thesis project (rubrics) so that assessment of the Programme Intended Learning Outcomes (PILO’s) are rounded off appropriately at the end of the programme.
- In order to improve the overall curriculum (and for the sake of transparency and reflection), a document needs to be composed in which the PILO’s have been defined, how they are assessed and how they are used to evaluate/improve the curriculum
- The department needs to develop methods to better incorporate and integrate research in the programme.

In closing, the Bachelor programme’s profile is strongly of an applied nature and highly appreciated by industry. There is a very strong connection with industry and the presence of direct (immediate) entry for students from the programme to practice. Yet, there is little throughput to a Master programme and it is unclear which research competencies are relevant for your programme. As a result, it is unclear whether more research would be good for your current profile. It may, be better to focus on better developing students’ 21st century skills and competencies.

Should there be a desire to develop research skills in students, it may make sense to develop a new Bachelor profile (next to the existing) that could serve as throughput for the Master programme. Such a step requires a fundamental, strategic choice that needs to be supported with several features including a strategic vision and changes to human resource policy.