Development Dialogue

Programme	Mathematical Engineering (after 1-09-2022 Applied Mathematics)
Orientation and level	University of Applied Sciences, Bachelor
Variants	full-time
CROHO registration number	35168
Accreditation decision d.d.	8-07-2022
Development Dialogue d.d.	31-05-2022

Setting and participants

A total of 13 participants were present, most of whom from Inholland: eight team members of Mathematical Engineering (subsequently ME), two board members and one support staff member of the faculty of Engineering, Design and Computing. Two members of the external audit committee were present at the development dialogue; the chairman and an expert.

The development dialogue was held at the location Diemen on the 31st of May, 2022 from 10 till 12 o'clock. Prior to the development dialogue a meeting was held on the 23rd of May between the head of the programme, teacher and chairman of the committee to demarcate and discuss the topics and related questions.

Intake

In preparation of the development dialogue a document was shared with the committee members wherein an overview was given of all developments regarding recruitment activities between August 2011 and May 2022. During the preliminary meeting it was agreed upon to demarcate the topic of intake, to intake from secondary education and Research Universities. The main results of a recruitment report by YoungWorks on the programme ME were shared with the participants at the start of the development dialogue.

Our main questions concerning the topic of intake are:

- What are our "blind spots"?
- In what field/ which fields can we further develop?
- Are there developments on a national or regional scale we can join or need to consider?
- How can we strengthen our collaboration with Research Universities?
- Who could and/ or should we contact?

Members of the committee and team members agree that there are possibilities for intake in the collaboration and communication between ME and relevant related programmes at Research Universities given 1. appropriate study choice, 2. upstream and 3. downstream and 4. lateral intake of artificial intelligence.

Appropriate study choice

An appropriate study choice leads to more study success. Members of the committee and team members agree that potential students benefit when the information provision on the similarities of and differences between studying at a Research University or University of Applied Sciences is better highlighted during information sessions at Research Universities and Universities of Applied Sciences. Unfortunately the social pressure to aim for the highest possible study level diminishes the potential study success for a group of students at Research University. The expert states that at this moment too many students apply for a programme related to ME but at Research University. Those students would likely have a bigger chance of study success if they would apply at ME at University of Applied Sciences. The areas of interest and/ or capacity of these students match better with the programme ME at University of Applied Sciences than with the related programme at Research University.

Upstream

There are two groups of students at ME who switch to Research University: upstream after the propaedeutic phase and alumni. Approximately 10% of the first year students leaves ME after receiving their propaedeutic certificate and apply for related programmes like Mathematics at Research Universities. This set of students consists mostly of international students who use ME as a stepping stone when their diplomas do not meet the intake prerequisites of programmes at Research

Universities. ME is an attractive alternative for international students because of the international focus and English as main language. The second set of students have completed the programme ME and apply for Masters at Research University. The members of the committee advise the team to align their programme with related programmes at Research University in order to help alumni to enrol in pre-Master programmes.

Downstream

Students who switch from Research University to a programme at a University of Applied Sciences do not seem to find ME. The members of the committee and team members are confident that there are possibilities for this set of students as outlined in the section appropriate study choice. The team contacted a study advisor at a certain faculty from a university in Amsterdam and exploratory discussions are being held to discuss the possibilities for switching students. The committee encourages the collaboration and advises to expand the collaboration to other related programmes at Research Universities.

Lateral entry Artificial Intelligence

The members of the committee highlight one of the results from the report from YoungWorks stating that most of the potential students are motivated for ME because of their interest in mathematics. Seen the increasing intake at programmes as Artificial Intelligence at Research Universities the members of the committee presume that a part of the potential Artificial Intelligence students have a talent for mathematics and advises the team to explore possibilities to focus recruitment activities specific for this group of potential students.

Feedback year four

In preparation of the development dialogue a document was shared with the committee members to illustrate the content of the minor Data Science, Math & Technology (subsequently minor). At the start of the discussion a presentation was held by the coordinator of the minor on the position of the minor in the curriculum of the programme. Our main questions concerning year four are:

- How do you evaluate the subjects we discuss?
- Are there any subjects you'd add or delete?
- In your opinion: how does the content relate to our focus point Data Science? Especially for
    o Geographic Information Systems;
    o Natural Language Processing;
    o Ethics.
- Are there groups or movements we should cooperate with?

The members of the committee asked several questions concerning the position of the minor in the programme, the content and focus of the minor. The combination of modules and projects and specific attention for ethics is explicitly valued by the members of the committee. They encourage the team to highlight the position and contribution of mathematicians in the Data Science sector in their minor.

Position in the programme

The minor (30 ECTS) is positioned in the first semester of year four. The minor is mandatory for ME students and open for students from Inholland and other Research Universities and Universities of Applied Sciences when they meet the intake requirements.

The combination of theory and projects was discussed by the chairman and members of the team. The chairman values the supply-driven combination of gaining knowledge and applying knowledge in a separate interdisciplinary project as well as projects integrated in the modules. The team underlined that scaffolding and complexity are at a level that may be expected for fourth year students.

The position and content of the minor in year four in regard to the minor Deep Learning in year three was discussed by the expert and team. Although a switch of years might have been better, seen the topics of the minors, the set up of both minors is well thought through and there is hardly any overlap in content.

Content and focus

The team made a conscious choice for Geographic Information Systems and Natural Language Processing based on feedback from the work field. The expert challenged the team by asking to motivate their choice in relation to other choices that could have been made. They further discussed alignment with the content of these topics at Research University.

The chairman points out that the developments in Data Science and Geographic Information Systems are closely monitored by work field and programmes in the Bachelor of Built Environment cluster. He expects that there will be students from Bachelor of Built Environment interested in this topic. The team will inform programmes in the Bachelor of Built Environment cluster at Inholland to evaluate the fit of the minor for their students.

Throughout the programme, attention is paid to ethics but always as part of a module and/ or project. In the minor specific attention is given to ethics in a separate module and four case studies from Princeton University are the backbone of the module. The expert and chairman value the specific attention for ethics in the field of Data Science. A well balanced approach of ethics from the perspectives of mathematicians, legislators and philosophers is advised. They stress the essential role mathematicians have in the discussion on reliability of data and use of algorithms. The expert points out that programmes in Data Science should prepare their students for the Data Act proposed by the European Commission in February 2022.