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PEER REVIEW NEW PROGRAMME

PROFESSIONAL MASTER ROBOTICS SYSTEMS ENGINEERING

Saxion University of Applied Sciences

SUMMARY REPORT
10 May 2021

1 Peer Review

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts forms the basis for the panel's final judgement and the advisory report. The focus is on the curriculum, the teaching and learning environment, and student assessment.

The Accreditation Organisation of the Netherlands and Flanders (NVAO) takes a formal decision on the quality of the new programme based on the outcome of the peer review. This decision can be positive, conditionally positive or negative. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme. Upon completion of the programme graduates are entitled to receive a legally accredited degree.

This summary report contains the main outcomes of the peer review. A full report with more details including the panel's findings and analysis is also available. NVAO bases an accreditation decision on the full report.

Both the full and summary reports of peer reviews are published on NVAO's website www.nvao.net. There you can also find more information on NVAO and peer reviews of new programmes.

Because of COVID-19 temporary measures apply for this peer review.

2 Panel

Peer experts

1. Prof. dr. Ming Cao (*chair*), professor in Networks and Robotics, Faculty of Science and Engineering, University of Groningen;
2. Dr. Felipe Nascimento Martins, lecturer and researcher, Institute of Engineering, Hanze University of Applied Sciences, Groningen;
3. Ton Peijnenburg MSc, research fellow, High Tech Systems Center (HTSC), Eindhoven University of Technology, and manager System Engineering, VDL Enabling Technologies Group, Eindhoven;
4. Willemijn Hoogland BEng (*student*), student MSc in Architecture, Delft University of Technology, and former student Honours Programme, Windesheim University of Applied Sciences, Zwolle, and Wentworth Institute of Technology, Boston (MA, USA).

Assisting staff

- Aurelie van 't Slot MA, secretary;
- Michèle Wera MA, NVAO policy advisor and process coordinator.

Site visit
Online, 6 April 2021

3 Outcome

The NVAO approved panel reaches a conditionally positive conclusion regarding the quality of professional master Robotics Systems Engineering offered by Saxion University of Applied Sciences. This 1,5-year full-time programme (90 EC) is offered in Enschede.

Students of the MSc Robotics Systems Engineering receive high-quality training in the core professional tasks of systems engineers, focused on robotic systems. Graduates will have the knowledge, skills and understanding required to oversee the execution and evaluation of complex engineering processes for robotic systems, including both the technology and project management perspective. The profile of the programme is well-aligned with the needs and developments of the (regional) professional field. Strong involvement of the professional field is also apparent in the curriculum, where cases and assignments are often derived from professional practice. Nearly all courses are assessed with authentic professional products.

The study programme was developed in close collaboration with the Saxion research group Mechatronics. The curriculum is aligned with the Research & Development roadmap of the research group. Cases, examples and assignments are based on current applied research projects. In this way, state-of-the-art knowledge finds its way into the programme and students are taught the latest developments. The programme intends for students to meet and collaborate with researchers and (systems) engineers in a learning community. The close physical proximity to the research group Mechatronics will no doubt contribute to the establishment of this learning community.

The assessment policy of the School of Life Science, Engineering & Design, which guides the assessment of the MSc Robotics Systems Engineering, is well-thought-out. Many of the professional products that form the basis for examination are developed in a group setting. This method of assessment is particularly valuable for the proposed programme. It resembles professional practice where engineering projects are group efforts. However, it remained unclear how the programme currently guarantees assessment of the individual contribution to group work. Considering the broad range of backgrounds of incoming students, there is risk of students freeriding or social loafing.

In conclusion, the panel is convinced of the quality of the proposed programme and expects that the MSc Robotics Systems Engineering will be an attractive programme fulfilling a clear industry need. The individual assessment, however, needs to be clarified and safeguarded. All in all, the panel assesses the quality of the programme as conditionally positive. The condition relates to the assessment of individual contribution to professional products developed in a group setting.

4 Commendations

The programme is commended for the following features of good practice.

1. Involvement of professional practice – The regional professional field is strongly involved in the programme. The profile of the programme is kept up to date by periodic discussion

with the TValley board of industry. Cases and assignments in the programme are often based on professional practice, which befits its focus on industry application.

2. Collaboration with research group Mechatronics – The curriculum of the programme is aligned with the Research & Development roadmap of the Saxion research group Mechatronics. Cases, examples and assignments are derived from current applied research projects. In this way, state-of-the-art knowledge finds its way into the programme and students are taught the latest developments.

3. 'System Improvement' course – The inclusion of this course in system improvement is a smart and creative choice. Most engineering work is about the redesign and improvement of existing systems.

4. Community-driven approach – The programme intends to create a learning community where students meet and collaborate with researchers and (systems) engineers from the professional field. This community-driven approach allows students to broaden and deepen their knowledge, as well as work on their professional development.

5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. Definition of systems engineer – Clearly communicate what the programme means by a 'systems engineer'. This is to the benefit of the expectations of both future students and future employers.

2. Theoretical foundations – Ensure sufficient coverage of the theoretical foundations of robotics systems engineering in the curriculum. A solid theoretical basis is a prerequisite for the development of professional products.

3. Intake and selection procedure – Carefully examine the criteria applied in the intake and selection procedure for students who are not directly admissible to the programme.

6 What comes next?

NVAO grants initial accreditation to a new programme on the basis of a panel's full report. The decision is valid for a maximum of six years. For conditional accreditation other regulations apply. Upon accreditation the new programme will follow the NVAO review procedures for existing programmes. NVAO publishes the accreditation decision together with the full report and this summary report.[1]

Each institution has a system of quality assurance in place ensuring continuous follow-up actions and periodic peer-review activities. Peer reviews help the institution to improve the quality of its programmes. The progress made since the last review is therefore taken into

consideration when preparing for the next review. The follow-up activities are also part of the following peer-review report. For more information, visit the institution's website.[1]

7 Summary in Dutch

Het panel oordeelt positief onder voorwaarden over de kwaliteit van de hbo-master Robotics Systems Engineering van Hogeschool Saxion. Dit is de uitkomst van de kwaliteitstoets uitgevoerd door een panel van *peers* op verzoek van de Nederlands-Vlaamse Accreditatie-organisatie (NVAO). Voor deze beoordeling heeft het panel gesprekken gevoerd met de opleiding op 6 april 2021.

Studenten van de MSc Robotics Systems Engineering worden getraind in professionele kerntaken van systeemingenieurs, met een focus op robotsystemen. Afgestudeerden beschikken over de kennis, vaardigheden en inzichten die nodig zijn om toezicht te houden op de uitvoering en evaluatie van complexe *engineering* processen voor robotsystemen, met aandacht voor zowel technologische aspecten als projectmanagement. Het profiel van de opleiding sluit goed aan bij de behoeften van het (regionale) werkveld. De sterke betrokkenheid van het werkveld blijkt ook uit het curriculum, waar cases en opdrachten vaak ontleend zijn aan de beroepspraktijk. Vrijwel alle vakken worden beoordeeld op basis van authentieke beroepsproducten.

De opleiding is tot stand gekomen in nauwe samenwerking met de Saxion onderzoeksgroep Mechatronics. Het curriculum sluit aan bij de Research & Development roadmap van deze onderzoeksgroep. Cases, voorbeelden en opdrachten zijn gebaseerd op actuele onderzoeksprojecten. Op deze manier vindt state-of-the-art kennis de weg naar de opleiding en leren studenten over de nieuwste ontwikkelingen. De opleiding voorziet in een leergemeenschap waar studenten, onderzoekers en (systeem)ingenieurs elkaar ontmoeten en samenwerken. De fysieke nabijheid van de onderzoeksgroep Mechatronics zal ongetwijfeld bijdragen aan de totstandkoming van deze leergemeenschap.

Het toetsbeleid van de School of Life Science, Engineering & Design is goed doordacht. Veel van de beroepsproducten die de basis vormen voor toetsing worden in groepsverband ontwikkeld. Deze toetsvorm is waardevol voor de opleiding, omdat *engineering* projecten in de beroepspraktijk ook in groepsverband worden uitgevoerd. Het bleef echter onduidelijk hoe de opleiding de beoordeling van de individuele bijdrage aan groepswerk inricht.

Het panel is overtuigd van de kwaliteit van een aantrekkelijke opleiding die voorziet in een duidelijke behoefte van het werkveld. Al met al beoordeelt het panel de kwaliteit van de opleiding als voorwaardelijk positief. De voorwaarde heeft betrekking op de beoordeling van de individuele bijdrage aan beroepsproducten die in groepsverband zijn ontwikkeld.

Meer informatie over de NVAO-werkwijze en de toetsing van nieuwe opleidingen is te vinden op www.nvao.net. Voor informatie over Hogeschool Saxion verwijzen we naar de website van de instelling.[2] Als gevolg van de beperkende omstandigheden door COVID-19 geldt voor deze kwaliteitstoets een tijdelijke procedure.

[1] https://www.saxion.edu/
[2] https://www.saxion.nl

The summary report was written at the request of NVAO and is the outcome of the peer review of the new programme Professional master Robotics Systems Engineering of Saxion University of Applied Sciences

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NVAO

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