# HAN University of Applied Sciences

## M Engineering Systems (full-time, part-time)

## Limited programme assessment with ITK


January 2026

M Engineering Systems

# Summary

In November 2025, the current HBO Master's programme Engineering Systems of HAN University of Applied Sciences was visited by an NQA visitation panel. This is an international English-language programme of 90 EC offered in Arnhem, both full-time and part-time.

The panel assesses the quality of the programme as **positive**. There is a well established programme provided by a well-organized and expert team. The synthesis of an international community, good lab facilities, cooperation between full-time and part-time students, and input from both the research groups (lectoraten/professorships) and the professional field leads to a rich learning environment, which is ideally suited to what may be expected of a professional master's programme.

**Standard 1: Intended Learning Outcomes**
The programme (full-time and part-time) **meets the basic quality** of this standard. The programme maintains a current professional profile that is aligned with an involved professional field, partly through the competent Master Advisor Council and active involvement of the Research Groups Automotive Research and Balanced Energy Systems. The orientation through the Automotive Systems, Cyber Physical Systems, and Sustainable Energy tracks aligns with the needs of the professional field, but the panel nevertheless sees opportunities in a further broadening of the profile or a deepening of the last two tracks. It advises the programme to take steps to continue offering an interesting proposition to both international and national students in the future and enabling new influx of students. The intended learning outcomes, formulated in seven final qualifications, are appropriate for the technical domain and carefully aligned with the Dublin Descriptors. They thus meet the NLQF 7 level (and EQF7).
The strong international orientation is evident, among other things, from the collaboration in the joint degree European Master of Automotive Engineering with partner institutions in the Czech Republic, France, and Germany.

**Standard 2: Teaching-Learning Environment**
The programme (full-time and part-time) **meets the basic quality** of this standard. The programme has a well-thought-out structure with clear organization, a strongly recognizable focus on applied research, and sufficient substantive flexibility to remain up-to-date. There is a well-qualified and organized results-responsible team that succeeds in creating a safe and instructive international community for students. The mix of full-time and part-time students in the execution of research projects is clearly of added value. A point of attention is the staffing of the team where many alumni have been employed. The panel advises the programme to look more outward of the programme when filling vacancies to bring in more different perspectives and experiences.

**Standard 3: Assessment**
The programme **meets the basic quality** of this standard. The programme works with a guiding academy-wide assessment policy, enabling the programme to make clear choices appropriate for the master's level. There is constructive alignment: the assessment system is well aligned with the intended final qualifications. The varied assessment methods suit the content and didactics of the different parts of the modules. The programme communicates clearly with students about the approach, organization, and content of the assessment. Sufficient attention is paid to the risks

and opportunities that generative AI entails. The examination committee has been well positioned and can better fulfill its safeguarding role now that the Assessment Assurance Committee is also operational.

**Standard 4: Achieved Learning Outcomes**
The programme **meets the basic quality** of this standard. The final assignments of the programme undoubtedly meet the master's level and have a recognizable focus on systems and modelling. Students demonstrate their ability to work methodically to arrive at useful concepts. Alumni of the programme are in great demand and can start working immediately, both in the Netherlands and internationally. For part-time alumni, the rule is that they generally stay with their employer and take a next step in their careers there.

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# Introduction

This visitation report contains the assessment of the existing HBO Master's programme Engineering Systems of HAN University of Applied Science. The NQA visitation panel that carried out the assessment was compiled by NQA, commissioned by HAN University of Applied Science, and in consultation with the programme. Prior to the visitation, the NVAO approved the panel. The report describes the findings, considerations, and conclusions of the panel. The report has been drawn up in accordance with the *Assessment Framework for the Accreditation System for Higher Education in the Netherlands, the Implementation Rules for the Accreditation System for Higher Education in the Netherlands 2024* of the NVAO and the *NQA Manual Programme Visitations Higher Education 2024 Programme Review with ITK recognition*.

The visitation took place on November 13, 2025.

| Name | Role | Short job description |
|---|---|---|
| Drs J.A.L.M van Erp | Chairman, domain expert | Transition manager at PUM, and lecturer in Group Dynamics at the EGC (Ecole de Gestion et de Commerce) in Lille and at VIVES in Kortrijk and Brugge |
| B.W.M. Bozon MSc | Domain expert | Senior lecturer ICT TI (Technical Informatics) and Master Next Level Engineering and EE (Electrical Engineering) at Utrecht University of Applies Sciences |
| P.R.J. Janssen MSc | Domain expert | Manager testing and Proto build at VDL-ETS |
| A.M.A.Khan | Student member | Master student studying the European Master in Renewable Energy programme(EMRE) at Hanze University of Applied Sciences |

Drs. R. Pijpers, senior auditor of NQA, acted as the panel secretary.

The Engineering Systems programme is classified in the HBO Automotive visitation group. Alignment between all sub-panels was ensured by instructions regarding the assessment framework and by overlap in staffing.

*Panel Working Method and Process*
For the programme assessment, the programme provided self-evaluation and appendices. For the assessment of the achieved learning outcomes, the panel studied fifteen graduation works of recent graduates. These files were selected based on a gross list of alumni from the past two years, accounting for variation in student appreciation and programme variants.
Three weeks prior to the visitation visit, the preliminary consultation and material study took place at the location of the programme (the agenda-setting audit). During the visitation visit, the panel spoke with various stakeholders, including students, lecturers (examiners), and representatives of the professional field. At the end of the visit, the panel communicated the final judgment and important findings during a concluding oral feedback session. Staff and students of the

programme were given the opportunity to approach the panel (via email) outside the day of the visit (open consultation hour). Nobody made use of this opportunity.

After the visit, a draft report was drawn up and submitted for checking factual inaccuracies by the programme, and subsequently, the report was definitively adopted. The visitation panel declares that the assessment of the programme took place independently.

Utrecht, January 2026

| | |
|---|---|
| Chairman of the panel | Auditor |
| J.A.L.M van Erp | R. Pijpers |

# Sketch of the programme

The Master Engineering Systems (MES) is part of the Academy of Engineering and Automotive (AEA), one of the 13 academies of the HAN University of Applied Sciences. The MES has existed as an independent programme since 2019. At the time of the visitation, the programme had three specialization tracks: Automotive Systems, Cyber Physical Systems, and Sustainable Energy. The MES is an international English taught 90 EC programme and has a full-time and a part-time variant.

The international orientation includes the opportunity for students to complete parts of their studies abroad at affiliated foreign universities in the Czech Republic, Germany, and France, thus obtaining a dual degree: the European Master of Automotive Engineering.

The intake in 2024 was around 50 students per year and shows a downward trend and showed a downward trend after the corona period. In 2025, the intake stabilizes and shows a slight growth. Specifically, the international intake (about half the student population) is under pressure. The programme is increasingly targeting bachelor students from The Netherlands (NL, EN) and from within the EU, partly through the Transfer Minor Energy Systems, which can function as a bridge to the Master's programme.

### Basic Data of the Study Programme

| Institute | |
|---|---|
| Name in RIO | Hogeschool Arnhem Nijmegen |
| Address | Ruitenberglaan 31 |
| Website | www.HAN.nl |
| BRIN-number | 25 HB |
| Status | Funded |
| ITK | Positive |

| Study Programme | |
|---|---|
| First name in RIO | Master Engineering Systems |
| Location | Arnhem |
| ISAT-code | 49136 |
| RIO-sector | Sector Technology |
| Orientation and level | Applied sciences master programme |
| Language of instruction | English |
| All programmes, majors and specialisations | Automotive Systems, Cyber Physical Systems and Sustainable Energy |
| Joint Programme | n.a. |
| Degree and Degree Addition | Master of Science |
| Study load in EC | 90 EC |
| Variant(s) | Full-time, Part-Time |
| Delivery date report | May 2026 |
| Date of visit by visitation panel | November 13, 2025 |

## Retrospective view of previous accreditation

The previous panel in 2019 gave seven recommendations, as follows:
• **Standard 1:** The recommendation to further elaborate the profile as a professional master in contact with foreign universities was implemented through discussion with dual degree partners and collaboration with Thomas More University of Applied Sciences(Belgium).
• **Standard 2:** The recommendation to investigate increased student access to scientific sources resulted in the programme focusing on strengthening source usage and the use of open access publishing, as access to the databases of the Institute of Electrical and Electronics Engineers was determined to be too expensive.
• **Standard 3:** Recommendations included paying more attention to the quality of questions in written examinations. This resulted in applying the four-eyes principle and curriculum committee involvement. The Exam board was also advised to strengthen its role. It is now better in control, partly through the establishment of an assessment safeguarding committee and the issuing of a clear AI guideline.
• **Standard 4:** Recommendations included improving feedback quality on major project assessment forms (resulting in sessions for examiners and extra checks) and strengthening the translation of theory into practice (students now explicitly report on this in literature and methodology chapters). The programme decided that every (final) qualification must be concluded with a passing grade (5.5 or higher), rather than varying the weighting of qualifications as was recommended.

The current panel is of the opinion that the programme has sufficiently addressed the recommendations from 2019.

# Assessments of NVAO-standards

## Standard 1 Intended Learning Outcomes

*The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline and international requirements.*

### Conclusion

The programme (full-time and part-time) **meets the basic quality** of this standard. The programme maintains a current professional profile that is regularly aligned with an involved professional field, partly through the competent Master Advisor Council and active involvement of the Research Groups Automotive Research and Balanced Energy Systems. The orientation through the Automotive Systems, Cyber Physical Systems, and Sustainable Energy tracks aligns with the needs of the professional field. The panel nevertheless sees opportunities in a further broadening of the profile or a deepening of the last two tracks. It advises the programme to take steps in this regard to continue offering an interesting proposition to both international and national students in the future and to enable new influx of students. The intended learning outcomes, formulated in seven final qualifications, are appropriate for the technical domain and carefully aligned with the Dublin Descriptors. They thus meet the NLQF 7 level (and EQF7). The strong international orientation is evident, among other things, from the collaboration in the joint degree European Master of Automotive Engineering with partner institutions in the Czech Republic, France, and Germany.

### Substantiation

*Professional Profile*
As written explicitly in the Master of Engineering Systems profile description, the programme aims to train entry-level competent engineers who can independently solve complex, practice-related problems. Core aspects of the profession include:

1. Systems and Modelling: Focusing on modelling smart, dynamic systems that perceive and respond to their environment.
2. The coupling function: Graduates are prepared for a leading role in the engineering business, acting as crucial links between technical engineers (scientific) management, and various departments.
3. Innovation and Research: Graduates are able to translate research into products relevant to the market and society, involving the development of new technical knowledge and applications.

The relevance of the profile is maintained through regular consultation (twice a year) with the Master Advisory Committee and the Research Groups for Automotive Research and Balanced Energy Systems.

With the choice for three tracks, the programme responds to both the strategic themes HAN (mobility, energy, and digital technology) and current challenges and demands primarily, but certainly not exclusively, the regional industry. The emphasis on automotive aligns with the specific expertise in this area that has traditionally been present within HAN. The Cyber Physical Systems track focuses on the integration of digital technology and physical processes, particularly on advanced (embedded) control systems used in contemporary industry. The Sustainable Energy track focuses on sustainable and renewable energy systems and connects with current issues in the energy transition. With the three tracks, the programme also explicitly tries to attract different types of students. Students from the academy's own related bachelor's programmes (Automotive, Embedded Systems, Electrical Engineering and Mechanical Engineering) can further specialize or broaden their knowledge through the tracks offered. For international students, knowledge in the field of automotive, for example, is an attractive USP. Students from other bachelor's programmes also find opportunities in the tracks for further specialization or broadening of their knowledge.

The profiling of the programme has the attention of the MES team, due to the expected and partly already visible decline in the number of students. Particularly among full-time students, a substantial decline in international applications is a concern. The internal discussion concerns deepening and specification on the one hand and broadening and flexibilization on the other. The panel discussed this theme with the core team on the day of the audit. The panel endorses the importance of both careful consideration and building on the programme's own strengths. At the same time, emphasizing these elements means that the programme will get a primarily internal focus. The panel therefore advises the programme to involve the outside world more strongly in the planning, and, given the importance of a good student intake, not to postpone decision-making on this matter.

*Intended Learning Outcomes*
The programme has based the intended learning outcomes on the Dublin Descriptors for the master's level and translated them into seven specific competence-oriented final qualifications. These qualifications are detailed in the table below. The panel finds these final qualifications clear and appropriate for the Engineering domain. The clear link with the Dublin Descriptors, which is also included in the Self-evaluation, substantiates that the qualifications are at the required master's level (NLQF 7 level and EQF7).

| | |
|---|---|
| *Analyzing and defining problems* | To be able to critically analyze the engineering problem through active communication with the problem owner, to translate this to a problem formulation, feasible solution approaches and scientifically valid conclusions and recomdmendations, to be communicated again to the problem owner. |
| *Design* | To be able to systematically translate the engineering problem to a model at an abstract level, (i.e. reducing it to its essentials in terms of model and problem requirements) and to validate results against the real life situation and problem formulation. |
| *Testing* | To be able to systematically translate the engineering problem to a concrete level, and to validate results against the real life situation and problem formulation. |
| *Managing work processes:* | To be able to put engineering activities within the perspective of engineering company processes, including quality control principles. To be able to incorporate the economical (cost) and societal (safety, sustainability) consequences in the design or development process. |
| *Conducting research* | To have gained specialized scientific knowledge and skills in the field of engineering. |
| *Communication and collaboration* | To be able to work on a problem within a multidisciplinary context in an industrial environment.<br>To be able to work on a problem in an international engineering context in an industrial environment |
| *Professional development* | To be able, through self-reflection, to improve one's own professional acting |

Figure 1: Final qualifications of the Master Engineering Systems programme (source: Self Evaluation)

The final qualifications were established through consultation with the Master Advisory Council, with which the programme meets twice a year in principle. This professional field committee consists of representatives from companies such as Royal Haskoning DHV, NXP Semiconductors, DAF Trucks, OutSmart, HyMatters and Hanze UAS Groningen. Recently, the committee was expanded to include alumni. In addition to the formal input via the Master Advisory Council, the programme also gathers feedback on whether the programme is still up-to-date from the Research Groups Automotive Research and Balanced Energy Systems and from the professional field's being involved in the Major and Minor projects. The panel notes that the programme thereby utilizes sufficient sound board groups to keep the final qualifications relevant and up to date. One small comment by the panel refers to the fact that the Master Advisory Council was inactive for a long time during, but also after, the corona period and has only recently become operational again. The importance of external sparring partners has already been emphasized in the previous paragraph. The panel therefore encourages the programme to cherish and maintain the position of the Master Advisory Council.

*Applied Research*

The programme's vision of applied research can be briefly described as 'Translating research into products. This means that research is used to improve and enrich the professional practice. This involves translating knowledge and innovation into products that are relevant to the market and

society. Applied Research contributes to innovations in professional practice. The programme safeguards the up-to-date relevance of the research through close collaboration with the HAN Research Centers mentioned. Conducting research is one of the seven final qualifications and is elaborated as "acquiring specialized scientific knowledge and skills in the field of systems engineering." This research must be independent and demonstrate originality in developing or applying ideas, fitting the Dublin Descriptor Making Judgements. In the discussions with students, lecturers, and during the tour along the research facilities of the GreenTechpark Arnhem and the MORE project, the panel experienced that the programme has strongly integrated the execution of applied research into its curriculum.

*Internationalization*
In line with the vision of HAN and the academy, the programme views internationalization not as a goal in itself, but as a means to prepare students for learning, living, and working in an intercultural, diverse society and in an international labour market. The choice for an English-taught international programme aligns with this vision. The programme states that the field of engineering systems inherently has an international character. The professional practice is mainly internationally oriented due to the nature and orientation of the companies where graduates work after their studies. This applies both to companies in the region and to companies in the home country, where some of the international students return to work. It also shapes its international orientation through international collaborations with foreign universities, including the possibility for a double degree programme for the Automotive Systems track: the European Master of Automotive Engineering (MAE). The programme also sees the choice for an English-taught international variant as a contribution to reducing the scarcity on the labour market within this field. Moreover, English as the language of instruction ensures a higher student intake, which helps to guarantee the continuation of the study programme more effectively. The panel strongly endorses these principles.

# Standard 2 Teaching-Learning Environment

*The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.*

## Conclusion

The programme (full-time and part-time) **meets the basic quality** of this standard. The programme has a well-thought-out curriculum with a clear structure, a strongly recognizable focus on applied research, and sufficient substantive flexibility to remain up to date. There is a well-qualified and organized results-responsible team that succeeds in creating a safe and instructive international community for students. The mix of full-time and part-time students in the execution of research projects is clearly of added value. A point of attention is the staffing of the team where many alumni have been employed. The panel advises the programme to look more to candidates from outside HAN when filling new vacancies to bring in more different perspectives and experiences.

## Substantiation

*Structure and Content of the Programme*
The programme encompasses a total study load of 90 EC. The curriculum is structured into a teaching phase of 60 EC and a concluding Major Project (graduation project) of 30 EC. The first half year consists of two mandatory basic modules of 15 EC: Systems Modelling and Applied Control. Systems Modelling focuses on the modeling of smart, dynamic systems, and Applied Control focuses on the design and testing of control systems.
The two basic modules are structured in accordance with a fixed scheme: 10 EC for theory courses and practicals and 5 EC for a minor project. For example, the first module, Systems Modelling, consists of the courses Introduction Modelling, Applied Physics, System Identification, Energy Based Modelling, a practical course Practice Modelling & Simulation and System Identification, and a minor project on Systems Modelling.
In the second half year, students choose two elective modules that align with the track they wish to follow (Automotive Systems, Cyber Physical Systems, or Sustainable Energy). In this case, each module again has a fixed structure of 7.5 EC for theory courses/practicum, 5 EC for a minor project, and 2.5 EC for the Capita Selecta, where students engage with current specialized knowledge or scientific literature. Students can also choose not to follow one of the three tracks but rather choose two elective modules otherwise. This option appears to be particularly interesting for part-time students. Courses are assessed separately and individually. The minor projects involve group assessment. The programme operates using the 'flipped classroom' principle, where students study the course material beforehand and the contact moments are utilized for critical discussions, carrying out exercises with simulations on the laptop, and giving personal feedback.
The last half year consists of the Major Project of 30 EC in which students work individually on a practical technical problem, which is presented by an external client or by one of the research groups (or a combination). The content is aimed at demonstrating master's level via three linked goals: finding a solution for a practical problem for the client; the development of new knowledge

and applications in the technical domain; and the demonstration of all professional master competencies. This results in a master's thesis (report or article) and an oral defense.

The structure of the curriculum is detailed in the scheme below:

| | | | | | |
|---|---|---|---|---|---|
| **Semester 1** | Common Modules | Systems Modelling | | | 15 EC |
| | | Applied Control | | | 15 EC |
| **➔ Choose a track** | | Automotive Systems | Cyber Physical Systems | Sustainable Energy | |
| **Semester 2** | Choose 2 elective modules within your track | Innovations in Powertrains<br>Intelligent Mobility<br>Advanced Vehicle Dynamics<br>Hydrogen Technology | Embedded Control<br>Big Data & Small Data<br>Advanced Vehicle Dynamics | Reliable Electricity Hubs<br>Big Data & Small Data<br>Hydrogen Technology | 30 EC<br>(15 EC per module) |
| **Semester 3** | Thesis | Major Project | | | 30 EC |

Figure 2: Overview of the Master Engineering Systems Programme (source: Self Evaluation)

Part-time and full-time students follow the same programme, but the duration of study differs. Whereas full-time students have a nominal study duration of 1.5 years, this amounts to 3 years for part-time students. Both groups of students attend classes in mixed groups. Full-time students follow two modules per semester, while part-time students follow one module per semester. All modules are scheduled for a single day.

Two fundamental common threads are recognizable in the curriculum. First, the substantive focus on models and modelling, which is used to gain a deeper insight into issues and make decisions more quickly. Secondly, the focus on conducting applied research by having students work on research in groups through minor projects at the beginning of every module. Because the elective modules are provided by lecturers who are also active in the research groups, there is a strong link between education and research.
In the projects attention is paid to professional and academic skills such as collaboration, research skills, reporting, and presenting. To support this, the programme offers lessons and workshops on Professional Skills on for example the principles of project management, people management, self-management, and business communication.

The panel is enthusiastic about the design and content of the programme. It clearly observes that it is a system that has been running for a long time, making it clear to both lecturers and students what their objectives and assignments are. At the same time, the programme is flexible in terms of content, partly by working with the capita selecta. The panel finds that the programme has made a number of smart choices that ensure a rich learning environment, such as working with mixed groups (both international and full-time/part-time) and putting research projects at the centre of the programme.

The programme is up-to-date which is demonstrated, among other things, by the attention paid to generative AI, for example in the elective module Big Data & Small Data in the Cyber Physical Systems track, but also in projects in the other tracks. The panel also notes that the teaching team is attentive to further improvements, such as strengthening the connection between the still fairly generic basic modules and the content of the elective modules. The review of the different courses by the students is now mostly done informally. There is an official review but the response is rather low. This was acknowledged by the team and actions are taken to improve the response rate.

*Intake, progression and student support*
The programme uses the following admission requirements: a bachelor's degree in Automotive Engineering, Electrical or Embedded Engineering or Mechanical Engineering, or a comparable field, and a minimum grade of 7 out of 10 in physics and mathematics. Proficiency in English at B1 level must be demonstrated. In addition, an intake advisory interview is conducted by the study coach, based on a motivation letter and CV. Part-time students must hold a job position that enables them to successfully complete the Major Project. The programme offers additional mathematics courses that students can take before the start of their studies. These are also used to assess whether they can handle the required level. The panel considers the 'Transfer Minor Engineering Systems' to be a commendable initiative. This minor is offered in bachelor's programmes of various Engineering disciplines and provides technical deepening and broadening of engineering knowledge, and, after an intake interview regarding motivation and background, leads to exemptions for certain courses in the Master Engineering Systems.

Once students have entered the programme, a study coach is their fixed point of contact throughout their entire study period. The study coach supports the student in developing self-management and taking responsibility for their own learning process. The study coach also plays a role in supervising the minor project. The study coach discusses study progress with the student, typically twice a year for full-time students and once a year for part-time students. The study coach is also the first point of contact for study-related questions or issues, and in special situations. This includes cases in which the study does not progress as planned, or when the student has a disability or chronic illness. For international students, in addition to the study coach, there is the HAN International Office, which serves as a point of contact for non-study-related matters such as insurance and housing. Students consider the guidance provided by their study coach to be valuable, as evidenced by the interviews conducted by the panel and by data from the National Student Survey.

*Teaching Staff*
The programme has a well-qualified and well-organised, results-responsible team. The teaching is provided by approximately 35 lecturers (8 FTE). All lecturers hold a master's degree and 14 have a PhD. Many lecturers are part-time with relatively small appointments in the programme and are also often active as researchers in one of the research groups. As a result, these lecturers have research experience in relevant fields. In addition, the lecturers' CVs show that many of them have research experience at other institutes and/or relevant professional experience in the engineering sector.

The core of the teaching team consists of four lecturers who are jointly responsible for the management and substantive direction of the programme. There is also a Curriculum Committee with six lecturers. The members of this committee ensure the connection between research and education and are responsible for the content of the modules. Almost all lecturers hold the Basic Examination Qualification, and three lecturers hold the Senior Qualification. All lecturers are proficient in English (at least B2 level, but most of them at C1 or C2). Data from the National Student Survey show that students are satisfied with the lecturers' subject matter expertise, the guidance provided, and that they do not experience any language problems.

In the discussions the panel had with the lecturers, it was confirmed that the team is knowledgeable, motivated, and linguistically competent, that they work well together, and that they succeed in creating a safe and educational international community for students. The panel does note that many alumni of the programme are active within the teaching team. The panel recognises the advantages of this in terms of rapid deployability, familiarity with the programme content, and the ability to assess the quality of alumni. At the same time, this may lead to a somewhat inward-looking perspective in which valuable dissenting views are not organised. The panel advises the programme to adopt a more outward-looking approach when new vacancies arise, in order to bring in more diverse perspectives and experiences, also in light of the discussion on profiling mentioned under standard 1.

*Learning Environment*
The programmes have good laboratory spaces and facilities, which play an important role in the curriculum through the minor projects. The laboratory facilities are shared with other programmes within the academy. Some of these facilities are located in CONNECTR at the Cleantech Park Arnhem, a business park that hosts, facilitates, and connects sustainable and energy-related companies. Among other things, the Modular Research Vehicle project (MORE), a Power Lab for energy-related projects, the Mobility Innovation Center for sustainable mobility projects, and the Hydrogen Lab for sustainable energy projects are housed here. The panel was impressed by the physical learning environment that the programme offers its students, particularly by the way in which the programme utilises these excellent laboratory facilities. The lab environment is well equipped and enables the execution of several large projects simultaneously. The inclusion of bachelor students from various programmes (mechanical, electrical, etc.), master's students, researchers from the research groups, and the close ties with industry provides scale advantages that enable innovative projects relevant to the Netherlands. This scale advantage also results in successfully obtaining major grants from European or Dutch organisations. This is a rather unique lab, and in this respect the HAN appears to be outperforming applied universities of a similar size. The panel board advises to stay strict on safety instructions and guidelines.

The fact that projects are conducted in multidisciplinary teams (for example within the MORE project) involving bachelor students as well, and that the work focuses on achieving tangible improvements, offers great added value in strengthening the focus on the applied in Applied Research, according to the panel. With regard to the digital learning environment, the programme recently transitioned to the Brightspace platform. The interactive possibilities offered by Brightspace still need to be explored further. Students are satisfied with the information provided by the programme, although international students indicate that more general information from HAN is often in Dutch and frequently aimed at bachelor students.

*Internationalization*
The panel finds that the programme convincingly shapes its international character. First, through the choice to offer all education in English, which ensures that Dutch and international students work together from the very beginning. Attention is given to helping international students settle in, supported by the study coach and the involvement of the HAN International Office. During the visit-day interviews, the panel observed that there is indeed an international community, which it considers a strong added value. As expressed by the representatives of the programme itself, the panel considers working in mixed groups of students of different nationalities to be an important contribution to the development of students' professional attitude and international awareness, both for Dutch and international students.

In addition, there is the possibility, already mentioned under Standard 1, to pursue a dual degree. The programme for this is offered in collaboration with the Czech Technical University, ENSTA Bretagne, and the Chemnitz University of Technology. This provides students with the opportunity to experience parts of their studies abroad. To this end, students must successfully complete a full-time two-year programme, consisting of one year abroad and one year in the Netherlands. The modules completed abroad can be submitted to the HAN Exam Board for exemption. After successful completion, students receive both the Master of Science (HAN) degree and the European Master of Automotive Engineering (MAE). The panel believes that the programme encourages internationalisation in a meaningful way.

# Standard 3 Student Assessment

*The programme has an adequate system of student assessment in place.*

### Conclusion

The programme (full-time and part-time) **meets the basic quality** of this standard. The programme works with a leading academy-wide assessment policy, enabling the programme to make clear choices appropriate for the master's level. There is constructive alignment: the assessment system is well aligned with the intended final qualifications. The varied assessment methods suit the content and didactics of the different parts of the modules. The programme communicates clearly with students about the approach, the organization, and the content of assessments. Sufficient attention is paid to the risks and opportunities that generative AI entails. The Exam Board has been well positioned and can better fulfill its safeguarding role now that the Assessment Assurance Committee is also operational.

### Substantiation

*Assessment Policy*
In 2023, the academy established a new assessment policy that provides direction for the further development of assessment within the programme. This policy is built on four principles. The first is that assessment must be meaningful and aligned with the professional practice. This means that the aim is to assess authentic professional situations in an integrated manner. The second principle is assessment based on systems thinking, which includes ensuring that the assessment programme forms a coherent and logically structured whole. The third principle is that assessment contributes to self-directed learning, meaning that students learn, among other things, to reflect on their personal development and take responsibility for their own learning process. The fourth principle is that assessment and teaching are aligned, meaning that learning and assessment are always connected and take the intended learning outcomes as their starting point.

*Assessment Practices*
The panel recognises the principles of the assessment policy in the way the programme assesses within its modules. In each module, assessment is organised in a similar manner. The theoretical courses are assessed using a take-home assignment or a written exam, often in the form of a report. This also applies to the Capita Selecta, for which students must complete a literature or (scientific) article analysis, increasingly including a presentation. For the theoretical courses and the Capita Selecta, assessments are always individual. The minor projects have three assessment moments: the project plan, the group contribution, and the final report and presentation. In principle, students receive a group grade, unless the group contribution indicates that a deviation is warranted.

The panel has reviewed assessments from the basic modules and several electives, and notes that the programme works carefully, both in developing assignments and in formulating feedback.

The programme is fully aware of the impact of AI on assessment. This means, among other things, that the 'AI resilience' of take-home exams is critically examined, and that assessments/presentations are increasingly chosen instead. The programme has an up-to-date AI protocol explaining to students what is and is not permitted. In the basic module *Applied Control*, students are taught how to use AI responsibly in assignments and are asked to reflect on this. In the panel's view, the programme is sufficiently alert to both the opportunities and risks of AI use in assessment.

The programme is also aware of the risks of free-riding in the assessment of group-based minor projects and is working to reduce this, partly by increasing the use of peer feedback. However, during the interviews, the panel noted that lecturers' perceptions of the free-riding risk did not match those of the students, who indicated that it was still an issue. The panel advises the programme to develop the planned measures in consultation with students. The panel also compliments the programme on the clear way in which it explains its assessment vision and approach to students through the document Assessments Why and How.

*Assessment of Final Level (Major Project)*
The assessment of the Major Project (30 EC) consists of five formal examination moments. The first four steps are the major project proposal, the project plan, the progress evaluation, and the major project documentation. All these components are assessed with a pass/fail (go/no go). The first step is evaluated by the Major Project Board to ensure the academic and professional suitability of the proposed work. The Major Project Board consists of examiners and researchers involved in graduation supervision. The project plan and the progress evaluation are assessed by the HAN supervisor. The major project documentation is assessed by a first and second examiner, with the second examiner being the HAN supervisor and the first examiner the Major Project Board member. The final grade is determined in the fifth moment: the presentation and defense, assessed by the first and second examiner. In some cases, external assessors are involved in an advisory role, as is the company supervisor. For the final assessment, a form is used that is directly linked to the five Dublin Descriptors (and the programme's seven final qualifications). For each descriptor, a holistic grade is given, supported by a set of guiding questions and criteria. The final grade is the average of these five grades, and each grade must be 5.5 or higher.

The panel finds that the programme organises the graduation process carefully, with strong checks and balances, including the role of the Major Project Board, the four-eyes principle, and the involvement of external assessors. During the interviews, the panel learned that due to budget cuts the use of external assessors is under pressure. The panel encourages the programme to find ways to maintain this external check, as these external assessors provide an important outside view, and external calibration. In general the assessment forms the panel reviewed from all phases of the graduation process were completed carefully by examiners, making the final assessments transparent and traceable. In a few cases, however, the focus lay too heavily on what students did not do well.

*Safeguarding Assessment Quality*
At the programme level, the curriculum committee is responsible for designing, implementing, evaluating, and improving the assessment programme. It does so in collaboration with the teaching team and in line with the quality criteria established in the assessment policy. The

examiners are responsible for the (further) development and implementation of each assessment. They follow the assessment cycle described in the assessment policy. The team invests in calibration, particularly regarding the final level, for which the Major Project Board organises calibration sessions twice a year. The panel clearly recognises the results of this in the final assessments. However, the panel advises the programme to broaden its perspective by incorporating external points of view. The programme does not currently calibrate with comparable master's programmes in the Netherlands, even though the panel believes that suitable sparring partners can be found.

The Exam Board is organized at academy level. Two lecturers from the team are members. The board fulfils its statutory duties, such as appointing examiners. It monitors the quality of the graduation process by attending graduation assessments on a sampling basis. The Assessment Assurance Committee, appointed by the Examination Board, reviews assessments for validity, reliability, transparency, and the achieved final level. The committee reports periodically to the Examination Board. From the 2025/2026 academic year onward, the AEA Examination Board will work with an assurance plan and assurance agenda.

The panel spoke with representatives of the Examination Board and the Assessment Assurance Committee and finds them competent and, after some staffing challenges in 2023/24, now sufficiently staffed and well-positioned. The panel believes that adequate attention is now being paid to ensuring assessment quality. It also noted that the Examination Board is sufficiently aware of both the risks and the opportunities associated with the use of AI in assessment.

# Standard 4 Achieved Learning Outcomes

*The programme demonstrates that the intended learning outcomes are achieved.*

### Conclusion

The programme **meets the basic quality** of this standard. The final assignments of the programme undoubtedly meet the master's level and have a recognizable focus on systems and modelling. Students demonstrate their ability to work methodically to arrive at useful concepts. Alumni of the programme are in great demand and can start working immediately, both in the Netherlands and internationally. For part-time alumni, the rule is that they generally stay with their employer and take a next step in their career there.

### Substantiation

For the assessment of the achieved learning outcomes the panel reviewed fifteen graduation portfolios from recent graduates. A selection was made to ensure variation in final grades, tracks, and modes of study. The panel determined that all graduation works meet the intended master's level (NLQF 7). The panel was very positive about the nature and diversity of the assignments. The assignments clearly reflect what the programme sees as the essence of a professional master's degree: translating research into products. The graduation works show that research is used to improve and enrich the professional practice. They focus on translating knowledge and innovation into products that are relevant to the market and society.

Examples of themes addressed in the graduation works include a simulation and optimization to support controller choices for a hydropower plant commissioned by an international energy company (track Sustainable Energy); the development of a proof-of-concept detection method for automotive heat pump component degradation commissioned by a manufacturer of automotive parts (track Automotive); and the introduction of Precision Control for a Hydraulic Press (track Cyber Physical Systems). The latter assignment was carried out for the Smart Production Centre of HAN Automotive Research.

Alumni are satisfied about this programme and quickly find employment. Part-time students rate the programme more positively than full-time students, according to data from both the HBO Monitor and the programme's own alumni survey. In this survey, the relevance and quality of the education is rated at 8.5 (part-time) and 6.9 (full-time), respectively. The survey also shows that about half of graduates stay in the Netherlands for work, often at international companies. Others find work abroad, mainly within the European Union. Some alumni choose to start doctoral research to obtain a PhD. Some of them stay at HAN to teach and work at research groups or pursue their doctorates.

The professional field is also satisfied with the level of graduates, as evidenced by feedback from the Master Advisory Committee and company supervisors involved in the Major Project. The

panel spoke with several alumni and industry representatives and found this positive picture confirmed. The programme itself indicates that it wishes to further structure its contact with alumni by developing an alumni policy. Encouragement for this by the panel.

## Final Assessment

| | Master Engineering Systems<br>Full-time and Part-time |
|---|---|
| *Standard 1 Intended Learning Outcomes* | Meets the generic quality requirements |
| *Standard 2 Teaching-Learning Environment* | Meets the generic quality requirements |
| *Standard 3 Student Assessment* | Meets the generic quality requirements |
| *Standaard 4 Achieved Learning Outcomes* | Meets the generic quality requirements |

The judgments were weighed in accordance with the NVAO decision rules. Based on this, the visitation panel assesses the quality of the current HBO Master's programme Engineering Systems of HAN University of Applied Science as **positive.**

# Recommendations

**The panel has no recommendations**

# Appendices

# 1. Visiting Program

**Program External Audit Master Engineering Systems (MES)**

| | | |
|---|---|---|
| **Date** | : | **Thursday 13 November 2025** |
| **Location** | : | **Cleantech Park Arnhem (former IPKW), Building KB, Connectr, Westervoortsedijk 73, Arnhem \| Room W1.01** |
| **Panel** | : | **Jos van Erp (Chair)**<br>**Peter Janssen (Member)**<br>**Bart Bozon (Member)**<br>**Arab Muhammad Ali Khan (Student-member)**<br>**Roel Pijpers (Secretary)** |

| Time | Program item | Participants (name, function/role) |
|---|---|---|
| **09:50 -10.00** ***(10 min)*** | **1. Welcome** | • **Academy manager**<br>• **Accreditation core team members (3)**<br>**Research Groups members (3)** |
| **10.00-10.45** ***(45 min)*** | **2. Master Engineering Systems vision session (standard 1)** | • **MES Core Team representative:**<br>• **Research Groups members (3)**<br>• **Master Advisory Council/ Industry representatives (2)**<br>• **Curriculum Committee members (2)** |
| **10.45-11.00** ***(15 min)*** | **3. Break** | |
| **11.00-12.00** ***(60 min)*** | **4. Students session (standard 1,2,3)** | • **8 Students:** |
| **12.00-12.45** ***(45 min)*** | **5. Lunch** | |
| **12.45-13.15** ***(30 min)*** | **6. Tour of the building/facilities, 'working in the triangle'** | • **Student**<br>• **MES lecturers (2)** |
| **13.15-13.30** ***(15 min)*** | **7. Break** | |
| **13.30-14.15** ***(45 min)*** | **8. Lecturers session (standard 2,3)** | • **Study coach:**<br>• **MES lecturers (6),**<br>**Education Office representative** |
| **14.15-14.30** ***(15 min)*** | **9. Break** | |

| | | |
|---|---|---|
| **14.30-15.15** ***(45 min)*** | **10. Graduation session (standard 3,4)** | • **Examiners (4)**<br>• **Exam Board members (2)**<br>• **Alumnus** |
| **15.15-16.15** ***(60 min)*** | **11. Panel discussion, additional questions to team (if applicable), meeting with MT** | |
| **16.15-16.45** ***(30 min)*** | **12. Closure external audit and feedback from the Audit panel** | • **Academy manager:**<br>• **MES core team (4)**<br>• **Education Office representative**<br>• **Other participants of the audit program and MES** |

# 2. References


Master Engineering Systems profile description, 2023
Degree Statute and Education and Examination Regulation of the Master's Degree Course Engineering Systems, 2024-2025
Practical Guide for students of the Master Engineering Systems, September 2024 (update oct24)
Assessments Why and How, September 2023
Manual Major Project, September 2025
MES Major Project Supervising in small groups for supervisors, 2025
Borgingsplan excie AEA vastgesteld 13052025
Enrollment regulations, 2024-2025
Koerscommissie: De koers voor 2037
Adviesrapport studentbegeleiding AEA, February 2022
Voorlichtingspresentatie open dag&avond, 2024-2025
Information ACE Career Day
Internship brochure Engineering and Automotive, 2025
International Days Thomas More, 19 March 2025
Mathematics pré-ambule – course overview
Module Systems Modelling, professional skills overview
Modular Research Vehicle project (MORE)
Presentation Info session Major Project, September 2024
Jaarverslag Examencommissie AEA 2023-2024
Steekproef conclusies en procesbeschrijving van toetsborgingscommissie
MES AP Checklist toetsing, addition to [20a]
Verslagen Opleidingscommissie
Verslagen Curriculumcommissie
Verslagen Master Advisory Councel
Calibration sessions Major Project, 2024
Calibration sessions Major Project, 2025
Selectie NQA MES Afstudeerwerkstukken 23-24 en 24-25
Benoemde examinatoren 2024-2025 door Toetscommissie
Background lecturers/examiners/staff
Overview background students and graduates
Situatie analyse
Academieplan AEA 2025
Organogram AEA, januari 2025
RGW binnen AEA, 17 februari 2025
Flexible and Affordable Education for Varied Class Sizes in MES modules
DRAFT – MES Guideline Policy – Use of Generative AI MPs and MAJP
Module evaluations M SM and M AC 2024-2025
NSE 2025 Master Engineering Systems
Werkveldindicator MES DT 1,5 jr na afstuderen, 2024
Werkveldindicator MES VT 1,5 jr na afstuderen, 2024
Alumni evaluation survey (Excel and pdf)
Analyse instroom Master Engineering Systems, 2024-2025
Artikel TechGelderland (Leroy van Maurik)

Artikel Master mind
Start up class, E-mail and Program
Timetable MES 2024-2025
Newsletter Education Office
MES Café meeting
M AC FC Exam summaries, 2024-2025
Train the tutor program, 2024-2025
Track video's Master Engineering systems
Flyer Transfer Minor Engineering Systems, 2024-2025
Report MES HAN – Accreditation February 2020
Report internal audit MES 2020
Report Midterm Review Research 2025
Verslag Ontwikkelgesprek MES 27 May 2020
Toetsbeleidsplan AEA 2023