

ASSESSMENT REPORT

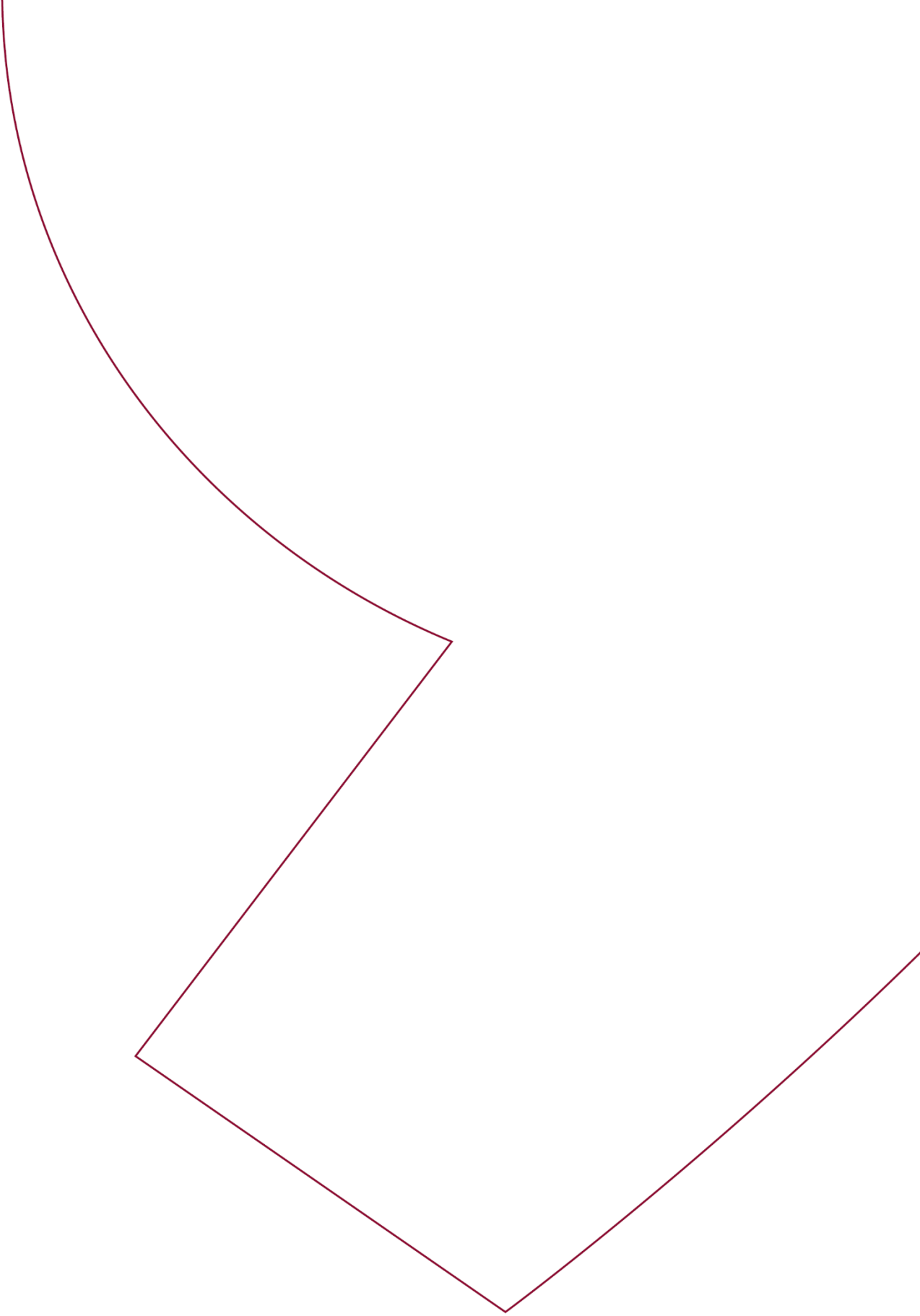
Extensive Program Assessment

Bachelor Luchtvaarttechnologie

Bachelor of Aeronautical and Precision
Engineering

Full time

Inholland University of Applied Sciences



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Croho registration: 34278

Hobéon Certificering & Accreditatie

DATE

February 27, 2024

Audit Panel

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1. GENERAL INFORMATION

Institution	Inholland University of Applied Sciences
Status	Funded
Outcome of Institutional Quality Assessment	Not applicable
Name of program in the Central Register of Higher Education (CROHO)	B Luchtvaarttechnologie
English name of program	B Aeronautical Engineering
ISAT-code CROHO	34278
Domain / Sector CROHO	Techniek
Orientation and level	HBO bachelor
Degree	BSc
Number of credits	240
Specializations	Precision Engineering (Only for students of the Dutch language track in years 1 and 2) Lightweight Structures Design and Development
Location	Delft
Variants	Full time
Joint Program	Not applicable
Languages	Dutch, English
Date of site visit	October 12, 2023

2. EXECUTIVE SUMMARY

2.1 Introduction and Program Profile

The Bachelor of Aeronautical and Precision Engineering (B A&PE) is a full time four year program offered by the Faculty of Engineering, Design and Computing (Dutch acronym, TOI) at Inholland University of Applied Sciences (Inholland UAS) in Delft. The program offers both a Dutch and English track for the first two years, while the last two years are taught only in English, reflecting industry practice and allowing for cooperation between the two tracks. The curriculum of the program has been reimagined since 2021 to focus more on a practice-oriented didactic approach that puts projects in the center of the program.

2.2 Findings

The program **fulfills the requirements of standard 1** to have appropriate intended learning outcomes. B A&PE makes use of the appropriate national hbo-engineering profile and the industry framework of Technology Readiness Levels (TRLs) to establish its Intended Learning Outcomes (ILOs). The program profile is divided into four primary technical knowledge bases: structures, performance, smart systems, and manufacturing; and three professional skill sets: entrepreneurial thinking, collaboration and cultural awareness, and design innovation.

The program **fulfills the requirements** related to the content and structure of the curriculum, **standards 2 through 5**. The curriculum of B A&PE is project based in keeping with the program's practice-oriented didactic approach. The panel finds that the structure of the program necessitates student involvement and self-direction. The curriculum is geared to address the needs of all incoming students.

The program **fulfills the requirements of standards 6 through 8** related to the teaching-learning environment. The teaching staff are qualified to teach the content of the program. The facilities housing the program are impressive and the panel notes the extensive tools available to students to complete their projects. Coaching and student support are both built into the curriculum and provided by central Inholland UAS student services.

The program **fulfills the requirements** related to quality assurance and testing in **standards 9 and 10**. The program has documented its quality assurance system and all of the relevant stakeholders are involved. The panel notes that the program can demonstrate improvements that have been made as a result of the quality assurance system. The system of testing is valid, independent, and appropriate for the didactic approach.

Finally, B A&PE **fulfills the requirements of standard 11** related to achieved learning outcomes. Industry partners are satisfied with graduates. The panel finds that the graduates demonstrate the fulfillment of the ILOs and the bachelor level.

2.3 Commendations

The panel commends the program, TOI, and Inholland UAS on the following points in particular:

1. The revitalized practice-oriented curriculum that allows students to learn knowledge and skills both in theory and in application.
2. The commitment of the teaching team, particularly the way in which they have adjusted to the coaching role in the new curriculum.
3. The impressive facilities available to students.

2.4 Recommendations

The panel has several recommendations for the program:

1. The program should profile itself more within the innovation ecosystem, for example by establishing an aerospace professorship and strengthening the relationship with TU Delft.
2. Include human centered design concepts earlier in the curriculum.
3. Implement admissions requirements or other such instruments to reduce first year dropout rates, help (prospective) students be realistic about the demands of the program, and increase gender diversity.
4. Ensure that all teaching staff are supported in their English proficiency.
5. Ensure that formative feedback is well calibrated and implemented throughout the curriculum. This includes ensuring that staff have sufficient time to assess each student.
6. The exam board take a more proactive role in the quality assurance system, for example by reviewing a number of graduation portfolios every year.

2.5 Conclusion

The panel advises that the NVAO re-accredit the program on the basis of the extensive accreditation framework.

In agreement with the panel members, the chair adopted this report on February 27, 2024.

3. FINDINGS

3.1 Intended Learning Outcomes

Standard 1: The intended learning outcomes tie in with the level and orientation of the program; they are geared to the expectations of the professional field, the discipline, and international requirements.

Explanation NVAO: The intended learning outcomes demonstrably describe the level of the program (Associate Degree, Bachelor's, or Master's) as defined in the Dutch Qualifications Framework, as well as its orientation (professional or academic). In addition, they tie in with the regional, national or international perspective of the requirements currently set by the professional field and the discipline with regard to the contents of the program. Insofar as is applicable, the intended learning outcomes are in accordance with relevant legislation and regulations. The points of departure for the set-up of the program chime with the educational philosophy and the profile of the institution. The intended learning outcomes are periodically evaluated.

The Bachelor of Aeronautical and Precision Engineering (B A&PE) program trains engineers for the aerospace industry and related sectors. In addition to the aerospace industry, the program views, for example, the renewable energy, automotive, railway, and offshore industries as relevant potential employers for graduates. In order to prepare students for these international and technically multifaceted sectors, the program makes use of both industry and didactic frameworks to ground its intended learning outcomes (ILOs).

The program utilizes the national HBO engineering profile (2022) as a foundational framework for the ILOs and curriculum. The use of the national profile helps align the program with the bachelor level (EQF/NLQF 6) and professional orientation of the program. The panel considers the use of the national profile appropriate for B A&PE. Furthermore, the panel is satisfied with the translation of the national HBO engineering profile into the profile, ILOs, and curriculum of the program.

Students are taught design and technical competencies oriented towards the implementation, testing, or validation of engineering solutions. These competencies align with technology readiness levels (TRLs) four through eight. The TRL framework is used internationally by industry to identify nine phases of technology development, implementation, and distribution: levels one through three concern fundamental research; levels four through six concern integrated system design and testing; levels seven and eight concern demonstration and certification; and level nine concerns operations. The panel considers that the use of the TRL framework and the chosen levels align the program with industry practice and supports its didactic approach. The panel recognizes the TRLs in the ILOs.

The HBO engineering profile and TRL frameworks are translated into the B A&PE profile. This profile is divided into four primary technical knowledge bases: structures, performance, smart systems, and manufacturing; and three professional skill sets: entrepreneurial thinking, collaboration and cultural awareness, and design innovation. The figure at right provides an overview of the core curricular elements. The panel considers this profile and the ILOs appropriate for the level and orientation of the program. The panel also finds that the decision to work with learning outcomes is appropriate.

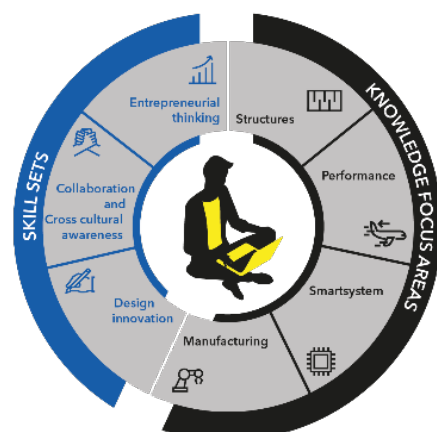


Figure 1 – provided by B A&PE

The program works with its advisory board composed of industry representatives to ensure that the profile and its implementation in the program align with industry needs and practice. The advisory board informed the panel that the profile of the program is appropriate for the level and professional practice. However, there are incongruities between the speed at which technology develops in industry, and by extension the needs of industry in terms of human capital, and the speed at which educational

programs can adjust their curricula. The panel notes that the program and advisory board are aware of this and work together constructively to address these concerns.

The program is involved in both academic and industry partnerships to maintain and update its knowledge base. The panel notes that the panel at the previous accreditation recommended that the program establish a professorship in the area of aerospace to help the program profile itself in the innovation ecosystem. This recommendation is discussed in standard 9. In reflecting on its discussion with industry representatives and its own expertise, the panel believes that the program would benefit from a larger profile within the industry and research communities. To that end the program could, for example, work with TOI to establish a professorship in aeronautics. The panel also suggests that the program strengthen its ties with TU Delft.

The program meets the requirements of standard 1.

3.2 Curriculum

Standard 2: The curriculum enables the students to master appropriate (professional or academic) research and professional skills.

Explanation NVAO: The curriculum ties in with current (international) developments, requirements and expectations in the professional field and the discipline. Academic skills and/or research skills and/or professional competencies are substantiated in a manner befitting the orientation and level of the program.

Standard 3: The contents of the curriculum enable students to achieve the intended learning outcomes.

Explanation NVAO: The learning outcomes have been adequately translated into educational objectives of (components of) the curriculum.

Standard 4: The structure of the curriculum encourages study and enables students to achieve the intended learning outcomes.

Explanation NVAO: The curriculum is designed in a manner conducive to the achievement of the intended learning outcomes. The teaching-learning environment encourages students to play an active role in the design of their own learning process (student-centered approach). The design of the learning environment chimes with the educational philosophy of the institution. If the program is taught in a language other than Dutch, the program must justify its choice. This also applies if the program bears a foreign language name.

The curriculum of B A&PE is project based. This is in keeping with the program's practice-oriented didactic approach in which education parallels industry practice. Knowledge modules are designed to work with projects that students are working on. The curriculum of the program is designed to progress from smaller group projects with more intensive teaching at the beginning of the program towards larger individual projects with more self-directed learning at the end of the program. A focus of the whole program is teaching students skills they need to function in the industry. The curriculum progression is designed to help students develop these skills by using them.

B A&PE describes the curricular progression in three levels:

Level 1 comprises the first year of the program. Here students work on structured short projects with intensive step-by-step coaching. Knowledge modules are focused on establishing a robust foundation that allows students to reproduce and understand fundamentals.

Level 2 comprises the second year of the program and the internship of the third year. Students work more intensively in the industry on more complex projects that last a whole semester. Coaching is focused on guidance and process monitoring. Knowledge modules help deepen the knowledge base and allow for more independent analytic work.

Level 3 comprises the remainder of the third year and all of the fourth year. Students work on developing their own profile by collaborating on complex projects with multiple stakeholders. Students are expected to complete projects independently under the supervision of a teacher and proactively seek out the assistance they need. The knowledge base is specialized as students choose electives.

The table below shows an overview of the four core knowledge areas described in standard 1 and the technical domains associated with each level. The panel considers the skills and technical areas relevant and recognizes the progression described.

Structures	Performance	Smart Systems	Manufacturing
Level 3 <ul style="list-style-type: none"> Wing (stress) design FEA of assembly 	Level 3 <ul style="list-style-type: none"> CFD analysis (3D) Flight performance analysis 	Level 3 <ul style="list-style-type: none"> Data Acquisition Flight control integration Multi-body dynamics 	Level 3 <ul style="list-style-type: none"> Automation of production Development composite production line
Level 2 <ul style="list-style-type: none"> Landing gear (stress) design Engine pylon (stress) design Component Design 	Level 2 <ul style="list-style-type: none"> Boundary layer analysis (2D) Basic flight performance analysis 	Level 2 <ul style="list-style-type: none"> Single-body dynamics Air vehicle systems 	Level 2 <ul style="list-style-type: none"> Composite production plan Material test plan (anisotropic materials) Quality assurance plan
Level 1 <ul style="list-style-type: none"> Lug Design Bracket Design Element/Part Design 	Level 1 <ul style="list-style-type: none"> NACA trade off Pressure distribution measurement in windtunnel (1D) Pressure distribution calculations over airfoil 	Level 1 <ul style="list-style-type: none"> Basic single order system Simulation of electronic system 	Level 1 <ul style="list-style-type: none"> NDI and NDT Component test Root-cause analysis

Figure 2 – provided by B&PE

The panel discussed the inclusion of human centered design in the curriculum with the teaching team and advisory board. In this context the panel considers human centered design to encompass engineering solutions that do not depart from the needs of users and social actors. In human centered design processes, original assignments are often discussed and reformulated to avoid solutions that, while efficient in terms of engineering, are ultimately suboptimal in practice. The panel wishes that more attention was paid, particularly early in the curriculum, for the need to compromise or pursue more ambitious engineering solutions that more adequately address non-engineering concerns. The panel recommends working to integrate human centered design throughout the curriculum to better address the user and socially oriented priorities of the aerospace industry. This could be done, for example, structurally within assignment formulations and requirements for projects.

B A&PE recognizes that it educates professionals for an industry that is dependent on international cooperation and global supply chains. The program and students value the international character of the program which mirrors the nature of the industry. Because the curricular design demands collaboration between students and the program attracts multi-national talent, students learn cooperative skills in an inter-cultural setting similar to the one they will encounter in the work place. The panel notes the importance of English in the aerospace industry and finds that the program is justified in its choice to use an English name and teach the last two years of the program exclusively in English.

The panel finds that the curricular structure of the program necessitates student involvement and self-direction. The practice-oriented didactic approach allows students to master the ILOs and build competences by learning relevant industry skills and working on “real world” projects. The panel compliments the program on this structure and finds that the program fulfills the requirements of standards 2 and 4.

The ILOs are reflected both in the content and structure of the curriculum. The panel reviewed module and project documentation and finds that these reflect the alignment of the program. It is clear that the content of modules and projects is appropriate. While the panel recommends more attention be given to human centered design, the core quality of the existing curriculum meets expectations. Therefore, the program fulfills the requirements of standard 3.

Standard 5: The curriculum ties in with the qualifications of the incoming students.

Explanation NVAO: The admission requirements in place are realistic with a view to the intended learning outcomes.

The program fulfills the requirements of standard 5. B A&PE has adjusted its curriculum to address the needs of all incoming students. The program has admissions requirements in place that reflect the demands of the program. While there are concerns regarding the mathematics component and the high drop out rate, the panel finds that these concerns are known and being addressed.

B A&PE is accessible for students from all three tracks of secondary education (mbo, havo & vwo) as well as similarly qualified international students. Because of this, the specific admission requirements vary depending on the academic background of the student. In addition, the curriculum must be structured to address the needs of all incoming students. The panel recognizes the challenge faced by the program here and applauds the work that has been done to make the program accessible to as many students as possible.

There are general eligibility requirements for the program. All prospective students are required to:

1. Demonstrate sufficient knowledge and proficiency in mathematics and physics..
2. Demonstrate English language skills as via a TOEFL or IELTS exam. This is also true for students of the Dutch track because years three and four of their program are in English. Dutch students who do not meet the English language requirements can start the program in Dutch and work to remediate the language issue during the first two years of the program.
3. A study check is compulsory. This check involves an online questionnaire and an interview to assess the appropriateness of the candidate and also serves as another means of evaluating language abilities. Students receive advice from the study check about their program choice.

The beginning of the first year is dedicated to orienting all students to the program and profession. Attention is given to introducing the didactic approach of the program through small group projects. Students are guided in study and collaborative skills that are vital to the successful completion of the program. The panel appreciates that the program's intention is to reduce the drop out rate of students by removing unnecessary hurdles and focusing on soft skills early in the program to give all students an equal chance.

Students informed the panel that the mathematics content of the program still forms a barrier, particularly for former mbo students. It is clear that not all students are fully aware of the mathematical demands of the program. Students suggest, and the panel agrees, that the program could do more to have students prepare for the program between their registration and the start of the first year. The program is working to clarify expectations for prospective students and ensure that the mathematics curriculum and tutoring is appropriate for all students.

The panel is concerned about the high drop-out rate in 2022 (40%) but notes that this may be an anomaly due to the return of stricter academic standards at the end of the COVID pandemic. The panel encourages the program to work towards reducing the drop-out rate either by increasing the selectivity of the program or further improving student monitoring and assistance. Finally, the panel notes that the program should do more to reduce the gender imbalance in its enrolled students (86% men, 14% women).

3.3 Teaching – Learning Environment

Standard 6: The staff team is qualified for the realization of the curriculum in terms of content and educational expertise. The team size is sufficient.

Explanation NVAO: The teachers have sufficient expertise in terms of both subject matter and teaching methods to teach the program. The teachers have a sufficient command of the language in which they are teaching. The staff policy is conducive in this respect. Sufficient staff is available to teach the program and tutor the students.

B A&PE fulfills the requirements of standard 6. The panel finds that the teaching staff are qualified to teach the content of the program. The curriculum is designed for teachers to fulfill a coaching role and staff are comfortable in this role. While staff are generally qualified to teach in the language of instruction, the panel encourages the program to ensure that it is maintaining its standards and helping all staff meet the requirements.

The staff of the program are qualified to teach the content of the program. Most hold masters degrees, seven are PhDs. The teaching team also reflects experience in professional practice. Lecturers are given didactic training on the teaching methods used in the course. Staff expressed to the panel that they are comfortable in the coaching role. Students informed the panel that they find their instructors knowledgeable.

Generally, all staff are qualified to teach in the language of instruction. Students noted to the panel that the level of English varies by instructor and expressed frustration in certain cases where the content expertise of instructors was lost in translation. The panel considers that these concerns are valid but finds that they reflect individual cases and that students are generally satisfied with the language abilities of their instructors. The panel encourages the program to ensure that it continues to address communications and linguistic concerns and help staff remediate potential language deficiencies.

The teaching team of B A&PE is composed of 42 people comprising 35 FTE. Teachers informed the panel that the work load is more distributed across the academic year now than it was six years ago. In addition, the coaching role fulfilled by educators in the curriculum has changed the nature of the work pressure. The panel finds that the size of the teaching team is sufficient for the program as it currently exists; however, the panel suggests that issues concerning the quality of formative feedback (discussed in standard 10) could be addressed by reducing the student to staff ratio. The panel is pleased to hear from staff that program management is responsive to concerns about work pressure.

Standard 7: The accommodation and material facilities (infrastructure) are sufficient for the realization of the curriculum.

Explanation NVAO: The accommodation of the program and the facilities are in keeping with the intended learning outcomes and the teaching-learning environment.

The program meets the requirements of standard 7. B A&PE is housed in its own building in Delft that is set up to facilitate the project oriented curriculum. The panel is impressed with the facilities that include a composites lab, a gas turbine simulator, a flight simulator, and a wind tunnel. The panel appreciates that the program has given students space to make the building their own. The program is searching for a new space because the current space has to be vacated. The panel encourages the program to allow students to shape whatever new space is found in a similar way.

With regards to its recommendation that the program do more to profile itself with the industry and research fields, the panel encourages the program to consider ways it can better support its student run study association. The panel suggests that the association could play a role in increasing the program's visibility if supported with appropriate resources.

Standard 8: Tutoring. The tutoring of and provision of information to students are conducive to study progress and tie in with the needs of students.

Explanation NVAO: Students receive appropriate tutoring (including students with a functional impairment). The information provision of the program is adequate.

The program fulfills the requirements of standard 8. Coaching is integrated into the structure of the curriculum. Within projects students' personal and professional development is monitored by a coach and they receive individual, development-oriented feedback. Students also have access to a study advisor who monitors and helps students work through barriers to their academic progress. For students who need more extensive support due to personal circumstances the program has a 'study coach+' who works with students to establish a support system that allows them to participate in the program as normally as possible. This is done in conjunction with the student counselor, lecturers, and the Board of Examiners.

The program uses digital systems procured by Inholland UAS to facilitate information provision to students. This includes an app, a digital learning environment, digital services such as the library, and a request submission page for the exam board. While the information provision is generally sufficient, students have complaints regarding the multiple lines of communication that are often used. The panel finds that this could be clarified but that students are well informed about the program and support systems. In addition, students value the informal culture of the program.

3.4 Quality Assurance

Standard 9: The program has an explicit and widely supported quality assurance system in place. It promotes the quality culture and has a focus on development.

Explanation NVAO: The program organizes effective periodic feedback that supports the achievement of the intended learning outcomes. Existing programs implement appropriate improvements based on the results of the previous assessment. They initiate appropriate evaluation and measurement activities to that end. The outcomes of this evaluation demonstrably constitute the basis for development and improvement. Within the institution, those responsible are held to account regarding the extent to which the program contributes to the attainment of the institution's strategic goals. Quality assurance ensures the achievement of the intended learning results. The program committee, examination board, staff, students, alumni and the relevant professional field are actively involved in the program's internal quality assurance. The program's design processes, its recognition, and its quality assurance are in keeping with the European Standards and Guidelines. The program publishes accurate, reliable information regarding its quality, which is easily accessible to the target groups.

Quality assurance policy at B A&PE is guided by the Faculty of Engineering, Design and Computing Quality Assurance Handbook (2018) which outlines a development oriented approach. The policy utilizes the PDCA cycle and is oriented towards both short cycle and strategic evaluations. Short cycle evaluations are designed to monitor teaching and individual courses. Strategic evaluations allow the program to utilize inputs from all stakeholders and formulate annual plans. Progress on these plans is monitored twice a year.

The program has documented the stakeholders in the PDCA cycle and defined their roles. These stakeholders include, among others, the exam board and program committee, the later of which includes students. The panel reviewed documentation about the inputs of the quality assurance cycle and finds that they are appropriate.

The program demonstrated to the panel that it is actively working towards meeting its goals. For example, the program has worked to eliminate examinations with extremely low pass rates. By working with teachers and appointing, for example, an assessment committee in 2022, the program has worked towards fostering a culture that is constructively critical of the purpose of examination. This has allowed the program to reduce fail rates without compromising on educational standards.

The panel appreciates the care with which the program has documented its quality assurance system. While the panel finds that there is a strong basis for a quality culture at the program, certain stakeholders could take a more proactive role. Specifically, the exam committee should work towards establishing an active stance that compliments the monitoring role it already fulfills. This is discussed further in standard 10.

The panel is pleased with the way most of the recommendations from the previous accreditation have been implemented in a revitalized curriculum. The panel notes that the program did not implement one of the suggestions related to the appointment of a professor in the aerospace domain. It should be noted that the panel makes a similar recommendation in relation to standard 1 that the program do more to participate in the research field. The panel acknowledges that the establishment of a professorship is not within the control of the program. There are well grounded reasons that a professor was not appointed in the past six years and the absence does not detract from the fulfillment of the standards at this time. The panel strongly suggests that the Faculty of Engineering, Design and Computing work with the program and industry stakeholders to address the position of the program relative to the field and research, for example by establishing a professorship in the aeronautical domain.

In its conversations with students and the program committee the panel was pleased to learn about the active role they are given in the quality culture of the program. It is clear that all stakeholders are included in development discussions that effect education quality. However, the panel notes that some concerns that are raised by student members of the program committee are not always addressed in a timely manner. The panel finds that this is a communication deficiency that the program should address, but that it does not detract from the ability of the program committee to effectively fulfill its role.

Although the program has room for improvement on standard 9 the panel finds that the program fulfills the general criteria of the standard.

3.5 Student Assessment

Standard 10: The program has an adequate student assessment system in place.

Explanation NVAO: The student assessments are valid, reliable and sufficiently independent. The quality of interim and final examinations is sufficiently safeguarded and meets the statutory quality standards. The examining board exerts its legal authority. The tests support the students' own learning processes.

B A&PE utilizes an assessment framework that aligns with its didactic approach. Teachers are free to design their assessments in line with established guiding principles. The assessment committee mandated by the exam board works with instructors to ensure that their exams align with the didactic vision, assess the appropriate learning outcomes, and promote learning. The program applies the four eyes principle to the design of all exams.

Within projects students are assessed on the basis of group and individual portfolios. This allows for a holistic assessment of acquired knowledge and skills. The learning process is oriented towards formative feedback and implementation. Students receive interim assessments from coaches and/or fellow students which is designed to support the learning and help address weaknesses constructively.

Students informed the panel that the quality of formative feedback varied by assignment and by instructor. The panel noted that with the shifts in the curriculum, formative feedback has become much more important to student development. Furthermore, because of potential for a move towards programmatic assessment, formative feedback throughout the year could come to play an even more important role. The panel encourages the program to consider ways it can better calibrate formative assessments and ensure that all instructors have enough time to grade and work with each student.

The panel reviewed the rubrics used by the program to assess students. The rubrics explicate the relationship between soft skills and educational attainment levels. In order to ensure that the assessments and the standards enforced by the examiners are as uniform as possible, the program organizes recurring calibration sessions. The exam committee reviews a report of the calibration sessions.

The exam board is effective in exercising its power to appoint examiners. The exam committee mandated part of its role regarding testing quality assurance to an assessment committee. The exam committee reviews a number of tests every year in addition to the checks performed by the assessment committee. There is regular consultation with other exam boards within the faculty. In addition, a meeting takes place every block between the chair of the exam board, the chair of the assessment committee and the team leader of the program. This cooperation facilitates oversight by the exam board.

Although the Board of Examiners is sufficiently in control, the panel finds that it could be more active in its role so as to ensure that it maintains up to date oversight of the calibration of examination practices. The panel maintains that, while not essential due to the position of members of the exam board within the program as teaching staff, it would behoove the exam board to carry out an independent annual review of a sample of graduation portfolios. This would help with the internal validation of examination and quality control practices.

The program meets the requirements of standard 10.

3.6 Achieved Learning Outcomes

Standard 11: The program demonstrates that the intended learning outcomes are achieved.

Explanation NVAO: The achievement of the intended learning outcomes is demonstrated by the results of tests, the final projects, and the performance of graduates in actual practice or in post-graduate programs.

The panel finds that the program fulfills the requirements of standard 11.

The panel reviewed the final projects of 15 graduates. Of these 6 were from graduates of the Dutch language 'luchtvaarttechnologie' track, 7 from the English aeronautical engineering track, and 2 from the English language precision engineering track.

The panel agrees generally with the evaluations of the projects and finds that the graduates demonstrate the realization of the ILOs in their work. The panel noted that in some evaluations examiners wrote remarks that might indicate doubt about the level of the student. The panel discussed the interpretation of the graduation requirements in regards to students who barely meet the mark with the program. From this discussion the panel concludes that the program ensures that all students demonstrate the realization of the ILOs and the bachelor level.

The panel finds that industry is generally satisfied with the quality of graduates. The panel notes that the advisory board is primarily composed of aerospace industry representatives, while graduates of the program go on to work in a number of fields. The advisory board informed the panel that, while they are happy with the quality of the graduates from the program, they find that not enough graduates pursue careers in the aerospace industry. While the panel recognizes this frustration of the aerospace industry it also regards the concern as a compliment for B A&PE on the employability of its graduates.

4. OVERALL JUDGMENT

The panel finds that the Bachelor of Aeronautical and Precision Engineering offered by Inholland University of Applied Sciences meets the requirements of all of the standards of the extensive NVAO framework for program accreditation. The panel advises that the NVAO re-accredit the program on that basis.

5. APPENDICES

Appendix I Overview of judgements

Overview of the judgements Inholland UAS B Aeronautical Engineering and Precision Engineering full time	
Standard	Judgement
Intended Learning Outcomes	
Standard 1. Intended Learning Outcomes	Fulfils the standard
Program	
Standard 2. Orientation programme	Fulfils the standard
Standard 3. Content programme	Fulfils the standard
Standard 4. Programme design	Fulfils the standard
Standard 5. Connection to previous studies	Fulfils the standard
Teaching – Learning Environment	
Standard 6. Staff qualifications and quantification	Fulfils the standard
Standard 7. Housing and facilities	Fulfils the standard
Standard 8. Tutoring and information provision	Fulfils the standard
Quality Assurance	
Standard 9. Quality assurance system	Fulfils the standard
Assessment	
Standard 10. Assessment	Fulfils the standard
Achieved learning outcomes	
Standard 11. Achieved learning outcomes	Fulfils the standard
Overall judgement	Positive

Appendix II Agenda of the site-visit

Bachelor of Aeronautical and Precision Engineering **The site visit took place on October 12 2023**

Time	Activity
09:00 – 09:30	Arrival, panel internal
09:30 – 10:00	Presentation program management
10:30 – 11:15	Discussion with teaching staff
11:15 – 11:45	Viewing and discussing year 4 projects with students and teachers
12:00 – 12:45	Discussion with exam, program, assessment, and curriculum committees
12:45-13:30	Lunch
13:30-14:00	Viewing and discussing year 1 projects with students and teachers
14:00 – 14:30	Discussion students, student representatives, and alumni
15:00-15:45	Discussion with industry representatives
16:00-16:45	Discussion with program management
16:45-17:30	Internal panel discussion
17:30	Feedback

The names of auditees are not included in this report due to privacy concerns. The names of auditees are known by the secretary of the panel.

Working methods

Selection of the auditees and open consultation opportunity

In compliance with NVAO regulations the audit panel decided on the composition of the auditee delegations in consultation with the program management and on the basis of the points of attention that arose from the panel's analysis of the provided documentation. An 'open consultation session' was scheduled as part of the site-visit program. The panel verified that the scheduled times of the consultation session had been made public to all parties involved in the school community in a correct and timely manner. No students or staff members attended the open consultation session.

Auditing process

The following procedure was adopted. The panel studied the documents regarding the program (see appendix iii) and a number of theses. The panel secretary organized input from the auditors and distributed the preliminary findings among the panel members prior to the audit. A preparatory meeting of the panel was held before the site visit took place at the institute on October 3, 2023.

The panel formulated its preliminary assessments per theme and standard immediately after the site visit. These were based on the findings of the site visit, and building on the assessment of the program documents. The panel had a few outstanding questions regarding the documentation of processes discussed during the audit. The secretary of the panel memorialized the document request and submitted this to the program. The program provided the requested additional documents to the panel which then reviewed and discussed them.

A first version of the assessment report was drafted by the secretary and circulated among the members of the panel for review and comments. The final draft was forwarded to the institution to

correct factual inaccuracies. Minor additions and clarifications were made as a result of questions and comments from the program. The panel finalized the report on February 27, 2024

Assessment rules

According to the NVAO assessment rules, a program can either fulfill, partially fulfill or not fulfill the requirements of each standard. Hobéon applied the decision rules, as listed in the "Assessment Framework for higher education accreditation system Netherlands, September 2018.

Appendix III

List of documents examined

List of documents examined

- Self evaluation
- Alumnibeleid.pdf
- API Evaluatie LT.pdf
- Basisgegevens opleiding.pdf
- graduation manual 2021-2022 LT-AE-PE version 1.pdf
- Han van Kleef Onderzoeksrapport How to Design - vs4.pdf
- Handboek Kwaliteitszorg TOI.pdf
- HBO Domeinprofiel Engineering.pdf
- INH BELEIDSDOCUMENT DENKEN EN DOEN (1).pdf
- Inholland Strategisch Plan 2022-2027 - Samenwerken aan een vitale metropool.pdf
- Jaarplan 2022 domein TOI definitief.pdf
- Jaarplan 2023 domein TOI.pdf
- Medewerkers tevredenheidsonderzoek (MTO).pdf
- Nieuwe procedure kwaliteitszorg.pdf
- NSE resultaten 2021-2022.xlsx
- Student Succes Centrum.url
- Visiedocument 2022.pdf
- 2023 Graduation Assessment form AS-07.docx

- Graduation manual 2023-2024 LT-AE-PE.pdf
- Inhoudelijke reactie AE_PE Inholland aanvullende informatie visitatiepanel.pdf
- Ontwikkelingsgerichte kwaliteitszorg en borgingscycli AE_PE_Inholland.docx
- Rubrics 3rd yr internship November 23.docx
- Rubrics Graduation Assignment November 2023.docx
- Rubrics instructions - 3rd year internship.docx
- Rubrics instructions - Graduation Assignment.docx

Following NVAO regulations, the panel reviewed the final projects of 15 students, including their evaluations. For privacy reasons, the names of these graduates and their student numbers are not included in this report. The names of the graduates, their student number, as well as the titles of the final projects, are known to the secretary of the audit panel.

Appendix IV Composition of the audit panel

The Bachelor of Aeronautical and Precision Engineering belongs to the visitation group HBO Luchtvaarttechnologie (uniek)

Succinct resumes of the panel members:

Name	Succinct CVs
Dr. J.C. Brezet	Professor emeritus TU Delft. Professor of Sustainable Innovation Aalborg University (Denmark)
A. Kanters	Business development director Europa, Embraer
J. A. Melkert	Lead teacher at the faculty of aerospace engineering at TU Delft
N. Ruijpers	Student, hbo aviation operations Hoogeschool van Amsterdam
Phineas Shapiro	NVAO certified secretary

Prior to the audit all panel members signed declarations of independence and confidentiality which are in the possession of the NVAO. This declaration certifies, among other things, that panel members have note in the past five years maintained any (family) connections or ties of a personal nature or as a researcher/teacher, professional or consultant with the program in question, which could impact their ability to independently judge the quality of the program in either a positive or negative sense.

In its decision dated October 6 2023 with reference PA-1588 the NVAO assented to the composition of the panel.



Hobéon

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