

**W.I.S.V. 'Christiaan Huygens'**  
Education Report 2022 / 2023

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# 1 Policy Progress

## 1.1 General

### 1.1.1 Master testimonials

Currently only minor and bachelor elective testimonials of students are available on the website. The students explain in their testimonials what their experiences are with a certain course or minor and what their reasons are for following that bachelor course/minor. This feedback is considered very valuable by other students, which is why the Board wants to extend these testimonials to the masters and their tracks.

The Commissioners of Education Affairs first asked around if students would rather like to see testimonials per track or per course. It turned out that for Computer Science, students want it per course. This is also more future-proof as the tracks will be discontinued when the new master program starts (see section 1.3.1). For Applied Mathematics, testimonials will be written per track. The Commissioners of Education Affairs have started asking around for testimonials, but have not received anything yet.

In order to make it easier for students to write a testimonial, the Commissioner of Mathematics Education Affairs created a template in which suggestions can be found on how to write a testimonial.

The Commissioners of Education Affairs have asked around for testimonials and have received a few. However, there are still a lot missing. The Commissioners of Education Affairs will hand over this task to the new board with the emphasis on contacting master students in the beginning of the year. The master testimonials that have been received are posted on a new page on the website: <https://wisv.ch/mastertestimonials>. The templates are also posted there.

### 1.1.2 ‘What to do after your Bachelors event’

A new education and career event was organised by the Commissioner of Mathematics Education Affairs, the Commissioner of Computer Science Education Affairs, and the Commissioner of Career Affairs this year. When writing the policy, the name was originally undetermined and it was therefore simply called ‘What to do after your bachelors event’. Eventually, the name Extracurricular Orientation Market was chosen, or EOM for short. As the change in name suggests, what started out as an event for orientation on what to do after your bachelor turned into an all round orientation market for extracurricular activities. This is a broadening of the scope, as it also includes full-time activities

The event was held on the 19th of January in the Foyer of the Aula. It was a market made up of stands where several organisations presented themselves such as dreamteams, student organisations (AISEC, Student Red Cross, WijWonen), fractions of the student councils, and volunteering organisations. A total of 19 parties participated in the event.

For a pilot, EOM was a success. Although the show up was lower than expected (roughly 60 people), the participating parties were happy and many student got to orient themselves on extracurricular activities. Also some board members of other study associations came by and showed interest to organise EOM next year together. This would likely result in a higher turnout and lower the cost for W.I.S.V. ‘Christiaan Huygens’.

After the evaluation of the first EOM edition. It was decided to host another edition on a bigger scale next year. This means involving other study associations in the TU Delft. The event was discussed on the ExVR and afterwards an email was sent out to all study associations asking whether they would like to be involved in organising and promoting EOM next year. The results of this are shown below.

With the associations who indicated that they would like to collaborate in organising EOM, a date has been set in the year planning: 18th of January. The further organisation will be picked up by the Commissioner of Career Affairs of Board 67.

| Association | Interested? |
|-------------|-------------|
| VvTP        | yes         |
| Leeghwater  | no          |
| TG          | unknown     |
| VSV         | unknown     |
| Curius      | yes         |
| ETV         | unknown     |
| Froude      | no          |
| Hooke       | yes         |
| ID          | no          |
| LIFE        | unknown     |
| MV          | unknown     |
| PS          | yes         |
| Stylos      | maybe       |
| Variscopic  | yes         |

## 1.2 Applied Mathematics

### 1.2.1 New evaluation form for elective courses

The bachelor program Technische Wiskunde contains a total of 19 elective courses. Due to the multitude of these, it is often not feasible to discuss all elective courses in the regular student panels. In quarter 3, the Commissioner of Mathematics Education Affairs noticed indeed that the amount of elective courses is a lot to handle during the student panels. In addition, it often happens that there are electives which are not discussed at the student panel at all due to there not being a student present who follows that particular course.

At the start of the year the Commissioner of Mathematics Education Affairs immediately told a representative of Education & Student Affairs that he had plans to look into a new evaluation form for elective courses. The representative quickly made it clear that Education & Student Affairs would not be happy with an extra student panel like format for discussing the electives. Therefore by advice of Francis Behnen (the Commissioner of Computer Science Education Affairs of Board 61), the Commissioner of Mathematics Education Affairs created a very short questionnaire which would be sent together with the invite of the student panel. In this questionnaire, the students are asked which elective they are following, whether they are satisfied with the course, and whether they are coming to the student panel. In this manner, there is an overview of which electives will be represented at the student panel, and there is an indication which courses need more attention. Moreover, if the Commissioner of Mathematics Education Affairs notices that a course is underrepresented at a student panel, he can actively search for participant who follow this course.

This solution aims to tackle under-representation of electives at student panels, but it does not help with the large amount of courses which need to be evaluated. After thorough discussion with the representative from Education & Student Affairs, the Commissioner of Mathematics Education Affairs concluded that there is not yet a consistent solution in order to evaluate all the elective courses thoroughly during the student panels, and that it might not be necessary to do so.

Instead, he will advice the coming the Commissioner of Mathematics Education Affairs monitor each elective well by having at least one contact person per elective. The Commissioner of Mathematics Education Affairs can ask this contact person for updates on how the course is going. On basis of these updates, more students can be invited to the student panel to give more extensive feedback on the elective, while other courses can be discussed briefly. If there are many courses which need to be thoroughly handled, the Commissioner of Mathematics Education Affairs can opt to organise a separate evaluation session.

### 1.2.2 Reselling of study books

With the vision of sustainability and the financial well-being of members, the Board decided to investigate setting up a resale system for study books. The focus for this resale system is on books in the Technische Wiskunde bachelor, as that is where most books are sold. This started with an interest form in which members were asked whether they were interested in such a resale system alongside several other questions. The results of this interest form can be seen in Appendix A.

The response on the form was very positive. Over 100 members filled it in and many also gave substantial feedback. Luckily, there was almost a perfect divide between members wanting to use the system as a place to sell books and members wanting to buy books through the system.

Due to the promotion of the resale interest form, the Commissioner of Mathematics Education Affairs was approached by a member who had already been working on a website for the reselling of study books, Daan Posthumus. Together with Mr Posthumus, the Commissioner of Mathematics Education Affairs further developed the idea of the system and discussed the suggestions made in the form.

The plans for the resale system were presented at General Assembly 4, where many questions were asked and comments were made. These comments were mostly regarding privacy and responsibility when an incident occurs. Luckily a consensus was made on all points. This resulted in a clear privacy statement, and terms and conditions being displayed on the website. Furthermore, the Commissioner of Mathematics Education Affairs will investigate incidents when they occur, but W.I.S.V. 'Christiaan Huygens' will not carry responsibility for the consequences of incidents.

The resale system is a website comparable to the Dutch Marktplaats.nl. Members can post advertisements, chat and search on the website for the books they need. The Commissioner of Mathematics Education Affairs will provide a list of study books which the site will be limited to in order to keep it overseeable. Mr Posthumus will keep hosting the website and after a pilot period, the collaboration between W.I.S.V. 'Christiaan Huygens' and Mr Posthumus will be evaluated and set in writing.

The resale system was launched halfway through march on the URL <http://www.studieboekswap.nl>. The Commissioner of Mathematics Education Affairs made promotion and slowly the website got some activity. Not a lot of books were posted throughout the rest of the academic year, but this is not a large surprise as not many books are used in the second semester. The Commissioner of Mathematics Education Affairs was contacted by some members saying they wanted to sell their books of quarter 1 on the website, and these were added somewhere during the summer holiday.

The contract between W.I.S.V. 'Christiaan Huygens' and Mr Posthumus was also finalised during the summer holiday and signed before the change General Assembly.

**update: contract is zo goed als klaar en moet nog ondertekend worden. Evaluatie van hoe het tot nu toe is gegaan? Kunnen we hier cijfers van krijgen? Daan geappt voor updates**

### 1.2.3 Evaluating feasibility of the double bachelor program

During the last student panel for double bachelors in the previous academic year, it was mentioned by students that the study load in the first semester of the third year was disproportionately high. In the beginning of the year, the Commissioner of Mathematics Education Affairs reached out to the programme coordinator of the double bachelor Technische Wiskunde & Technische Natuurkunde, Mr. J. de Groot, to ask whether this issue was known and whether plans had already been made to tackle it. Joost de Groot responded by saying that this was news to him.

Therefore, the Commissioner of Mathematics Education Affairs reached out to the academic counsellor of the double bachelor students, Mr. G. Broekman. He replied by saying that he does not have any influence on the curriculum of the double bachelor students and therefore referred the Commissioner of Mathematics Education Affairs to the directors of studies of both Technische Wiskunde and Technische Natuurkunde. The Commissioner of Mathematics Education Affairs has since not had time to investigate this further and will await the results of the student panel of the double bachelor before moving on.

Due to the plans for curriculum renewal of both the Technische Wiskunde and Technische Natuurkunde bachelor programmes, it is no longer logical to do an extensive research into the planning of the dou-

ble bachelor programme it will have to be created from scratch when both the bachelor programmes programmes are finished.

As for the student panel, only first year double bachelor student attended unfortunately which gave no insight in the feasibility of the third year. The first year students were very content with the programme.

## **1.3 Computer Science**

### **1.3.1 Involvement setting up new master**

Last year, the faculty of EEMCS started setting up a new master program: Data Science and Artificial Intelligence Technology (DSAIT). This would merge two of the Computer Science tracks: the Data Science Technology track and the Artificial Intelligence Technology track. These two tracks will thus be discontinued and only the Software Technology track will be continued in the Computer Science master program. The new master program was planned to start in the academic year of 2023-2024. To make sure the needs of students were met and that they are informed about the consequences of the new master, the Commissioner of Computer Science Education Affairs made sure to stay involved in the process of setting up this master program.

This was done by getting frequent updates about it during the three weekly meetings with Willem-Paul Brinkman, the Director of Studies. The matter was also discussed at the Board of Studies meetings. On November 15th, the accreditation of the program took place. Accreditation is a process by which the program is evaluated by an external panel against established standards to ensure that it meets certain quality criteria. Although the panel was very positive about the plans to introduce the DSAIT master, it felt that the program was not sufficiently complete to get the green light to start in September 2023. The education management is now busy addressing recommendations from the panel, in order to re-submit the request for the program to start in September 2024. The aim is to apply again for an accreditation at the start of the summer.

To work on the new master program, several task forces were set up to each work on a separate part of the accreditation. The Commissioner of Computer Science Education Affairs was involved in the program task force, which discussed the content of the master program. The task forces met up frequently to make more detailed plans for the new master program. Part of this was creating themes (similar to the variants of the second year of the bachelor) and looking at core courses and linking them to the intended learning outcomes. A new application for an accreditation has been sent to the NVAO and the faculty is currently still awaiting an answer. The Commissioner of Computer Science Education Affairs of Board 67 will be kept in the loop of any updates regarding the new master.

### **1.3.2 Research into book sale**

The book sale numbers for the Computer Science programmes are very low, especially for the master programmes. The Board puts quite some work in the book sale and gets member contact in return. However, if no books are sold, that member contact is lost and it might not be worth it to create a book prognosis each quarter. Therefore, the Commissioner of Computer Science Education Affairs is researching if books are still really needed and if there are any possible alternatives.

At the first Master Information Meeting, the Commissioner of Computer Science Education Affairs asked by a raise of hands who bought books and what alternatives they would like to see. There were around 20 students present and none of them had bought a book during their master programme. They all indicated that they would like to see some online platform for books/summaries. One student also stated that Brightspace is already quite a good platform for all the resources, so it might not be worth the work for W.I.S.V. 'Christiaan Huygens' to set up such a platform.

The Commissioner of Computer Science Education Affairs also created a Google form to collect more information. The form has 53 responses, which is a good amount. The results can be found in appendix C. The students who filled in the form come from a diverse group. There are students from all kinds of nationalities and also from a lot of different universities. Out of the 53 responses, 48 indicated that they did not buy a book during their masters. The main reasons for not buying books is because they are expensive, the courses do not require them or there are PDFs available online. The Commissioner

of Computer Science Education Affairs also did not include any master books in the book sale for the second quarter and out of the 53 responses, 50 indicated that they did not miss it. About half of the students who filled it in, indicated that they would like an online book or summaries platform. Some students also indicated that an (unofficial) online summaries platform already exists.

**Other study associations.** At the WISO, the Commissioner of Computer Science Education Affairs asked the other Mathematics and Computer Science study associations if they experience the same problem and if they have online alternatives. All the associations also had low book sale numbers and several indicated that they have an online summary platform. Some associations give a small reward to the members in return for uploading a summary. The Commissioner of Computer Science Education Affairs also talked with the commissioner of education affairs of Gezelschap Leeghwater. They also provide summaries for their members. They pay students to write summaries and offer them as physical booklets.

The Commissioner of Computer Science Education Affairs looked into the possibility of using exam arCHive as an online summary platform. This is possible, however it brings some difficulties regarding copyright and fraud, since there is also copyright on summaries written by students. To be able to have summaries in Exam ArCHive, there should be done research into these topics to assure that W.I.S.V. ‘Christiaan Huygens’ is acting legally. The Commissioner of Computer Science Education Affairs will discuss this with her successor whether it is worth it to do, since many summaries are already sent across Whatsapp groupchats and Brightspace is already a good source for course materials.



## **2 General**

### **2.1 Book sale**

Since the academic year of 2021/2022, W.I.S.V. ‘Christiaan Huygens’ has had Intertaal as their book supplier. In the contract between them it is stated that their collaboration should be evaluated twice annually, in October and in March. This year this has not been done, but extensive contact has taken place continuously between the two parties. The evaluation is stated in the agreement between Intertaal and W.I.S.V. ‘Christiaan Huygens’, which the Commissioner of Mathematics Education Affairs did not read until January 2023. Intertaal also did not initiate these evaluations on their own. Therefore it was decided that an evaluation session will be held in February, and that the next evaluation session would take place in May where the continuation of the collaboration will be discussed.

The communication between the Commissioner of Mathematics Education Affairs and Intertaal has been good in the first half year. The contact person at Intertaal has been very approachable and there was not much waiting for answers.

At the end of quarter two there was some small miscommunication about the sale of books for first year students. The Commissioner of Mathematics Education Affairs assumed that the books for first year students would be delivered at CH for a physical book sale, as they had been for the first and second quarter. This was not the case, but since only 1 first year course had a book to be ordered, this was not a big problem. It was decided that for this quarter, a completely online book sale was fine.

There were some errors in the book list for quarter one, which resulted in some stress during the summer holiday. However, this was quickly handled by Intertaal. The books for quarter one will not be delivered in bulk, but they will be delivered to the association room for the students to collect. This maintains the member contact, but reduces the amount of work for the new board.

The contact with Intertaal is still going very well and the new cooperation agreement was signed by the Chairman and the Commissioner of Mathematics Education Affairs at the end of the academic year.

#### **2.1.1 Book sale numbers**

The book sale numbers of the academic year 2022/2023 can be found in Appendix 1. This book sale data was provided by Intertaal on July 3rd 2023.

#### **2.1.2 Price referencing**

The Commissioners of Education Affairs did not have time towards the end of the year to make another analysis of the price differencing between WO4YOU and other online platforms for buying books. This takes quite some time, so this will be recommended to pick up for board 67. The price referencing of the first semester can be found in the semi annual education report.

### **2.2 VHTO Inclusivity Scan**

The VHTO - Expertise Centre Gender Diversity in Beta, Engineering and IT - has conducted a scan regarding diversity and inclusivity in the bachelor programmes Computer Science and Engineering and Applied Mathematics. The aim of this scan is to provide a baseline measurement of how diverse and inclusive both the programmes are. The scan was done by analysing student enrolment, dropout and BSA data, as well as doing a survey among students and organising focus groups with staff, students, TAs and W.I.S.V. ‘Christiaan Huygens’.

After conducting the scan, VHTO has created a report with their findings, conclusions and recommendations on how the study programmes can improve on diversity and inclusivity.

For Computer Science and Engineering it was concluded that the importance of diversity and inclusion is already acknowledged by a number of people within the study, however it is important to spread the importance more broadly. It was also concluded that the study culture within CSE is experienced as competitive and masculine, and that some minority students have a lower sense of belonging and self-efficacy compared to other students. VHTO has given some recommendations to improve the sense of

belonging and self-efficacy among students, which can be found in Appendix E. The program management is now working on implementing the recommendations with the curriculum revision in 2024-2025.

The main conclusions in the report for Applied Mathematics are the importance of a strong mentor programme and the presence of group work at the start of the first year. From surveys it was concluded that female students experience less prior knowledge, a lower sense of belonging and lower self-efficacy than their male counterparts. It is suggested that an inclusive environment, and a 'support culture' can have a positive impact on the experience of the female students. A good place to promote this is in the mentor programme as well as in the introduction of group assignment courses. These suggestions are received well by the management of the Applied Mathematics programme and will be included in the forming of the new curriculum. In the coming academic year, the mentor programme will also be revised with these suggestions in mind.

## 2.3 Testimonials

The Commissioners of Education Affairs are still working on collecting elective, minor and master testimonials. Since the master testimonials are part of the Education Policy this year, the priority was on finding students to write these. More information about the master testimonials can be found in section 1.1.1.

The Commissioners of Education Affairs have made an overview of all minors, electives and master tracks which are relevant for mathematics and computer science students. For each of these, there is an overview of whether there is currently a testimonial available and when it was written when it is.

For most elective courses, there is a (relatively) recent testimonial available. However, there are a lot of minors and master tracks for which there is not yet a testimonial. It has proven to be quite difficult to find students for these testimonials, so it will be instructed to the new board that this should be a focus point throughout the year.

## 2.4 Educator of the Year

This year, the TU decided to rename Teacher of the Year to Educator of the Year to make it more inclusive. Together with the Commissioner of Education Affairs of the ETV, the Commissioners of Education Affairs organised the Educator of the Year awards. To put more educators in the spotlight, it was decided to have more categories: best slides, most enthusiastic and best handwriting. It was also decided that the winners of the last 2 years could not win again. This is to prevent the same 2 people from winning every time. Lastly, there were winners for each study programme, so all BSc and MSc were looked at separately. The winners of the Educator of the Year awards were as follows:

### Applied Mathematics

1. Best slides: Rik Lopuhaä
2. Most enthusiastic: Richard Kraaij
3. Best handwriting: Emiel Loris
4. BSc winner: Dion Gijswijt
5. MSc winner: Robbert Fokkink

### Computer Science

1. Best slides: Christoph Lof
2. Most enthusiastic: Koen Langendoen
3. Best handwriting: Christophe Smet
4. BSc winner: Stefan Hugtenburg
5. MSc winner: Jan van Gemert

The faculty winner was the winner from the MSc Sustainable Energy Technology: Arno Smets.

## 2.5 Changes in OER/TER

Every year, the OER/TER (Onderwijs- en Examenregeling/Teaching and Examination Regulations) is updated. Most of the changes don't have a big impact, however there is a change in article 17A subsection 1, which brings significant changes. The article states that there must be two opportunities for written examinations per academic year and it is added that this also applies to assessments other than written examination such as projects and practicals. This means that there is a regular examination opportunity and a repair opportunity. Of course, this can not be reasonably demanded of every course, so in those cases a different option will be provided if possible. Additional rules for this article are added to article 5 of the Implementation Regulations.

This change is very positive for students, since it was usually not possible to repair all projects and practicals. This way, students will not experience study delay for courses which they failed on an assignment which could not be resitted. However, for lecturers this means quite a bit of extra work, since they have to create repair assignments for all projects and practicals. This also lead to some complaints from the staff members of the Board of Studies of Computer Science. The changes affect the workload of the teaching staff and therefore, the Board of Studies recommends that teachers are given a year to adjust their assessment according to the changes in the OER/TER.

## 3 Mathematics

### 3.1 Current affairs

#### 3.1.1 Mentor groups

A new system for the mentor groups of the bachelor Technische Wiskunde was implemented this year. In previous years, the general planning was to have two hours of mentoring. One hour was led by the student mentor, and the other by a professor. During the hour with the student mentor, topics like ways of studying, time management, mental health, and extracurricular activities were discussed, whereas the hour with the professor was similar to an exercise class where course specific material was handled. Because the student mentors and professors filled these hours in their own style, there was quite a large difference between the experiences of students within different mentor groups.

This year it was chosen to do two hours of mentoring in one session. In the first quarter, either the student mentor and teacher were present, or only the student mentor was present. These two hours consisted of two parts.

One part was an explanation by the student and the professor on topics such as preparation for exams, where to ask questions, BSA, and time management.

The other part had a game element. Students of all mentor groups were challenged with several mathematics themed puzzles and challenges with which they could score points. At the end of the quarter, one group would be crowned victorious.

#### Evaluation

During some mentor sessions, the student mentor was instructed to discuss and give advice on soft skills such as planning and time management. From the evaluation with the student mentors came that they wished to have more guidance in ways to address these topics.

Next year, the student mentors will have much more preparation and assistance throughout the first quarter. This will start with an afternoon of introduction and training before the start of the year. During the quarter, the student mentors will have an evaluation moment every two weeks. In addition to this, a Brightspace has been created as a guideline for the topics to discuss every week including powerpoints, challenges and instruction videos.

#### 3.1.2 Curriculum renewal

At the start of the year Wolter Groenevelt, the director of studies for the bachelor Technische Wiskunde, announced that there was a plan to remove Kaleidoscope from the first year of the bachelor and replace it with two new courses. The new courses would be a general problem solving course, and a calculus course with the aim of making the transition from secondary education to university easier. It later became clear that not just removing Kaleidoscope from the first year, but a large restructuring of the entire first year would be proposed instead. The Commissioner of Mathematics Education Affairs was sceptical of this plan as it seemed that close to the end of the calendar year, there was still some uncertainty of what this restructuring would look like.

In January, this plan of large restructuring was presented to the curriculum committee. The committee ruled that there was too little time to make such large changes before the beginning of the new academic year, as the Commissioner of Mathematics Education Affairs had expected. Instead, only the content of the course Kaleidoscope will change. Instead of the three separate subjects complex numbers, differential equations and graph theory, Kaleidoscope will become a calculus course. Because some of the topics which will be handled in this new form of Kaleidoscope are currently taught in the first year course Analysis 1, there will also be a minor change in this course.

The plans for a larger restructuring of the bachelor programme are postponed until the academic year 2024/2025. The Commissioner of Mathematics Education Affairs, Lucy Westerweel (Commissioner of Mathematics Education Affairs of board 65) and Adnan Hussain Cornelissen (EPA Commissioner of Mathematics Education Affairs 67) joined the curriculum committee as student representatives in quarter

4 and have attended a few meetings since. They will work together to represent the student body the best they can in the forming of the new curriculum.

### 3.1.3 Bachelor Endproject

In the academic year 2021-2022, the bachelor project coordinator, Theresia van Essen, investigated a suspected bias in grading the bachelor project. An analysis of the grades obtained by female and male students indicated that female students obtain lower grades on average. To reduce this suspected bias, this academic year, the grading rubric was revised and the members of the graduation committee were made aware of this potential implicit bias. A preliminary analysis of the grades shows that there seems not to be any bias anymore for the final grades for the bachelor project as well for the grades of the various sub-categories. This will be still monitored the coming years.

## 3.2 Early intervention first year bachelor students

Over the past few years the passing rate of first year bachelor students of Technische Wiskunde has been around 50%. This means that from all the students who enrol for the program, only 50% get their BSA. The numbers from the last few years can be seen in Table 1.

| 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 60%       | 55%       | 51%       | 46%       | 52%       | 52%       |

Table 1: BSA rate for first year students Technische Wiskunde

To find why there are so many students who do not receive a positive BSA, an investigation was started by Monique Draijer from Education & Student Affairs. The Commissioner of Mathematics Education Affairs is still awaiting the results of this investigation.

**toevoegen: resultaten bespreken van onderzoek**

## 3.3 BSc Technische Wiskunde

### 3.3.1 Year 1

This year the bachelor Technische Wiskunde started off with 166 students. Of these 166,

- 133 were Technische Wiskunde (TW) students, and
- 33 were double bachelor Technische Wiskunde and Technische Natuurkunde (TWN) students.

Currently, 82 students have stopped. This result in a total of 84 students of which

- 62 TW are students, and
- 22 TWN students.

**Student Panel** During the first two student panels 13 and 10 students were present, respectively. Inviting students during the opening of the academic year seemed to work quite well. The last two student panels were attended by 12 and 17 people, respectively. This is a very positive turnout.

**General Feasibility** The tempo of the first quarter was experienced as doable by the students. Even though it was doable, they mentioned that it was much higher than in secondary school and that the study load is much more.

The exam planning in week 3, 6 and 10 was received varyingly. Some students appreciated that it forced them to keep on track, while others felt that it increased their stress and conflicted with social activities outside of their studies. It was noted that especially the combination with student associations was difficult to manage during the start of the year.

The third quarter was quite tough according to most students. The electives take up a lot of time and most of the lectures were in the afternoon, which gave students little time for self study. The fourth quarter was very doable for most students.

**Mechanica en Relativiteitstheorie** Students mentioned that the elective course Mechanica en Relativiteitstheorie was very tough relative to the other elective courses. This was mainly due to a lack of prior knowledge of physics concepts. The Commissioner of Mathematics Education Affairs discussed this with the director of studies, who proceeded to discuss this with the relevant professor. This is something to keep an eye on the coming year.

### 3.3.2 Year 2

This year 82 students started the second year of their bachelor Technische Wiskunde. Of these 82,

- 52 were Technische Wiskunde (TW) students, and
- 30 were double bachelor Technische Wiskunde and Technische Natuurkunde (TWN) students.

From the 155 student that started in 2021, this is a decrease in students of close to 50%.

**Student Panel** There were 9 students at the first, and 10 students at the second student panel. Compared to expectation, it did not require extra effort to gather students for the student panel of quarter 2.

The third and fourth student panels were both visited by 9 students.

**General feasibility** Many students mentioned that the study load in the first quarter was very high and that there was not enough time for self-study. Most students accounted this to the course Real Analysis which took up most of their time. This was slightly different in the second quarter. Some students noted that the study load was more doable, while others still found it too much. It was mentioned that a lot of students chose to drop one course in order to focus on completing the others.

At the student panel in quarter three, only 1 out of the nine students followed the entire regular programme. All the others had already dropped one or multiple courses. In quarter four, none of the nine attendees followed the regular programme. This gives some indication on how normal it is for students to not finish the bachelor programme in three years.

The students also mentioned that the study load of the different (second year) electives in quarter three take up a highly varying amount of time. Some take up much more time than others.

**Real Analysis** As in previous years, many students complained about the disproportional study load of Real Analysis compared to the amount of ECTS which are obtained. The course was taught by a new professor this year, Emiel Lorist, with whom the Commissioner of Mathematics Education Affairs had a talk at the beginning of the year. Mister Lorist stated that he had reduced the number of exercises in the first quarter significantly compared to previous years. Students were very satisfied with the teaching style of the new professor and the lower number of exercises, but still believed the course to be worth more ECs than 6.

### 3.3.3 Year 3

**Student Panel** The first student panel was attended by 10 students and the one at the end of quarter 4 by 5.

**General Feasibility** Quarter three was doable for most students. They described it as "busy as usual". Some courses felt like more and some like less than 6 ECTS. This balanced out. The third year elective courses were evaluated positively.

Everything about the bachelor end project was evaluated positively.

### 3.3.4 Double Bachelor Technische Wiskunde & Technische Natuurkunde

The student panel for the double bachelor programme was attended by

### 3.4 Minors

#### 3.4.1 Finance

**Student Panel** There were 5 students present at the student panel for the minor Finance. Although this was a small group, there were several backgrounds represented. There were students from Maritime Engineering, Systems Engineering, Applied Earth Sciences and Computer Science who gave their feedback.

**General Feasibility** Students noted that compared to other minors, the workload seemed to be higher. Especially the second quarter was experienced as tough, due to project deadlines and exams.

#### 3.4.2 Computational Science and Engineering

**Student Panel** A total of 8 students were present at the student panel. The backgrounds of the students were Applied Earth Sciences, Computer Science, Aerospace Engineering, and Applied Mathematics.

**General Feasibility** The only critique that was carried by most students was on the higher study load in quarter one compared to quarter two. Many students agreed that this could be distributed better. Overall, the students were very positive about this minor.

### 3.5 MSc Applied Mathematics

**Focus group** It was difficult to gather students for the first focus group of the master Applied Mathematics. This was possibly caused by the meeting being planned on Friday afternoon in a period of many deadlines. However, there were four motivated student present to give their feedback on the master.

This was also the case for the second focus group. Again, four students were present: three from the Stochastics and one from Computational Science and Engineering.

**General Feasibility** There are a lot of deadlines during the exam period for students. It was suggested to move deadlines to either the end of quarter 1, or around week 2.7. This again came up in the second student panel. Martin van Gijzen has agreed to discuss this with professors in order to move the deadlines to earlier in the quarter.

## 4 Computer Science

### 4.1 Current Affairs

#### 4.1.1 BSc Computer Science and Engineering tracks

The last few years, the percentage of international students starting Computer Science and Engineering has been quite high (around 70-80%). Therefore, to attract more Dutch students, the Executive Board of the TU Delft wanted to introduce a two track system to the bachelor program. There will be a bilingual (Dutch-English) and an English track. Students following the bilingual track will get a Dutch mentor, but the mentor groups will still be mixed. Several academic skills, such as presenting and writing, will also be taught in Dutch. Furthermore, during the instructions for the mathematics courses and during the labs, students will be able to ask questions in Dutch. All the other study material will stay the same and the students from the two tracks will still follow the same curriculum and lectures. To be admissible for the bilingual track, students either have to have a VWO diploma or they have to be able to show a Dutch language proficiency certificate.

When applying for the study programme, students can choose their track. Based on their choice, they take the selection tests partially in Dutch or entirely in English. The final ranking is determined by the sub-ranking of the two tracks. Every student is ranked in their chosen track and the final ranking is alternately filled with the candidates from the sub-rankings, starting with the highest scoring candidates from each track. This will thus result in a 50/50 division of the bilingual and English track. However, there are much more candidates for the English track, so the candidates for the bilingual track would have too big of an advantage. Therefore, if one track consists of 10% less candidates than the other track, a threshold is set to compensate for the advantage. If the score of a candidate is not in the top 1200, they will be transferred to the largest track and get a placement in the sub-ranking of that track. After the transfer, the final ranking is made as described previously. This means that it is possible that one sub-ranking has less than half of the maximum capacity of 550 and that the division of the tracks will thus not be 50/50. A more detailed description of this selection procedure can be found in appendix D.

This year, 2946 students have applied for the bachelor Computer Science and Engineering. Out of these, 524 applied for the bilingual track and 2422 for the English track. The division of the students ended up being 50/50, meaning that there are a lot more upcoming Dutch Computer Science and Engineering students compared to this year where it was only 20%.

#### 4.1.2 Mentorate

In the upcoming year there will be a few slight changes in the mentorate. This year, there was already more time spent on diversity and inclusion by playing a dilemma game. This will be continued next year. There will also be more mentor lunches in the second quarter (every week, compared to every 2 weeks previously). Next to that there will also be mentor sessions focused on the Dutch/international students, so Dutch students will get an other session than the international students. This is due to the bilingual track that is starting in the upcoming year.

#### 4.1.3 Midterm Visitation

On June 6th, the midterm visitation of the bachelor program Computer Science and Engineering took place. An audit panel consisting of people from outside the faculty evaluated the program by talking to several groups of people within the program (Board of Studies, Board of Examiners, students, lecturers). The Commissioner of Computer Science Education Affairs took place in the conversation with the Board of Studies. After the midterm visitation, a report with the findings was written. The faculty asked the Commissioner of Computer Science Education Affairs to keep it intern, so it is not included in this education report. Some of the findings and recommendations were that the gender imbalance should be improved, that TAs play a big role in the program and that the workload is high for both students and staff. The audit panel also found that the feedback on assessment is not always useful for students.

The program management is currently looking to take action based on the report from the midterm visitation. The upcoming the Commissioner of Computer Science Education Affairs will be advised to



keep an eye on this next year.

#### 4.1.4 New Directors of Studies

As of June 1st, Andy Zaidman has stepped down as Director of Studies of the bachelor Computer Science and Engineering and Christoph Lofi has taken over this position. From September 1st, Willem-Paul Brinkman will also step down as Director of Studies of the master Computer Science. He will focus on setting up the new Data Science and Artificial Intelligence Technology master and he will become the Director of Studies of that program. Klaus Hildebrandt will be the new Director of Studies of the Computer Science master program.

## 4.2 BSc Computer Science and Engineering

### 4.2.1 Year 1

**Student panels.** The student panels for the first year courses were quite well visited. At the start of the year, the Commissioner of Computer Science Education Affairs showed a QR-code to a Whatsapp group chat at the General Assembly of the bachelor CSE and also at the mentor lunches. This resulted in a group chat of over 200 people. For each student panel, the Commissioner of Computer Science Education Affairs sends a link to a Google Form where students can sign up for the student panel. At the first student panel, 10 students were present and at the second student panel, there were 22 students.

The students were all very positive about the bachelor. The main point was that the study load became higher near the end of the first quarter. The Director of Studies will pay attention to this next year and the workload for Object Oriented Programming will be distributed more equally across the weeks. The students also experienced a high workload in the third quarter with the OOP Project. Next year, there will be some changes made to the project to reduce the workload. The heuristic usability evaluation will be removed in favor of a more lightweight introduction of usability goals, the overlap with SEM in requirements engineering will be removed and the requirements of the team deliverables will be slimmed down and better tailored to the course.

| Course code | Course name                       | Number of participants | Pass rate | Number of participants resit | Pass rate resit |
|-------------|-----------------------------------|------------------------|-----------|------------------------------|-----------------|
| CSE1100     | Object-oriented programming       | 524                    | 65%       | 231                          | 74%             |
| CSE1300     | Reasoning and Logic               | 509                    | 87%       | 109                          | 61%             |
| CSE1400     | Computer Organisation             | 488                    | 98%       | N/A                          | N/A             |
| CSE1305     | Algorithms and Data Structures    | 556                    | 56%       | 250                          | 57%             |
| CSE1200     | Calculus                          | 538                    | 68%       | 228                          | 55%             |
| CSE1500     | Web and Database Technology       | 380                    | 99%       | 477                          | 90%             |
| CSE1105     | OOP Project                       | 438                    | 96%       | N/A                          | N/A             |
| CSE1205     | Linear Algebra                    | 455                    | 64%       | 195                          | 55%             |
| CSE1505     | Information and Data Management   | 428                    | 76%       | 157                          | 60%             |
| CSE1110     | Software Quality and Testing      | N/A                    | N/A       | N/A                          | N/A             |
| CSE1210     | Probability Theory and Statistics | N/A                    | N/A       | N/A                          | N/A             |
| CSE1405     | Computer Networks                 | N/A                    | N/A       | N/A                          | N/A             |

Table 2: Pass rates CSE Year 1

### 4.2.2 Year 2

**Student panels.** The turnout for the student panels was alright. The first student panel was visited by only 5 students, which could have been better, because there was only 1 student from the Data variant. The second student panel was better visited as there were 10 students present. Unfortunately, there was only 1 student from the Multimedia variant present, so the feedback was not very representative.

**Computer Graphics.** As shown in table 4, the pass rate for Computer Graphics was very high this year. Last year, the pass rate for the first exam was 44%. In previous years, this course had been evaluated quite poorly, but it has been improved every year. Table 3 shows the grades that were given to the course by students for the last 4 years. The student panel gave the course a good grade, but the

Evasys grade was still quite low this year. However, it was only filled in by 16 students so it is not very representative.

The students indicated that they liked the course content and the lectures. They also thought the project was interesting and that the study goals were well defined. The negative feedback that was given was mainly about the grading of the course and the guessing correction of the exam, so it seems that the improvements that have been made over the years have helped. Next year they will further increase the transparency of the grading system, so students have a better idea of what they are being graded on. The guessing correction is something that the course staff wants to keep as it reduces guessing on the exam and it better reflects the knowledge of a student.

| Year      | Student panel grade | # students at student panel | Evasys grade | # students who filled in Evasys |
|-----------|---------------------|-----------------------------|--------------|---------------------------------|
| 2022-2023 | 7.4                 | 10                          | 4.4          | 16                              |
| 2021-2022 | 7.75                | 2                           | 4.2          | 64                              |
| 2020-2021 | 6                   | 5                           | 3.9          | 109                             |
| 2019-2020 | 3.58                | 12                          | 4.0          | 102                             |

Table 3: Computer Graphics course grades

**Data Mining.** Data Mining was experienced as quite hard, mainly due to there being too much content. The instructor agreed with this and will improve next year by dropping some content.

**Multimedia Analysis.** Multimedia Analysis was evaluated a bit poorly this year. Students felt that the labs were not very useful and not connected to the course material. The code was also migrated from a virtual machine to Vocareum, but this still left a few problems that were also a problem last year.

The course went through a few changes this year; there were some staff changes and the labs and ordering of labs were revisited. Due to the changes, there are still things that need to be improved. The staff will work on this for the next edition of the course. They will deal with the problems due to the switch to Vocareum, fix the ordering of the labs, add more practice questions, provide a clearer roadmap during the lectures and improve expectation management and guidance during the labs.

**Feasibility.** The second year was evaluated quite positively by the student panels. However, just like previous years, the workload in the second quarter was experienced as very high due to Software Engineering Methods. For the academic year 2024-2025, there will be a curriculum change, so there will be looked into possible solutions to reduce the workload of the second quarter.

| Course code | Course name                            | Number of participants | Pass rate | Number of participants resit | Pass rate resit |
|-------------|--|------------------------|-----------|------------------------------|-----------------|
| CSE2215     | Computer Graphics                      | 415                    | 96%       | 91                           | 100%            |
| CSE2510     | Machine Learning                       | 495                    | 65%       | 157                          | 68%             |
| CSE2520     | Big Data Processing                    | 292                    | 78%       | 73                           | 68%             |
| CSE2420     | Digital Systems                        | 161                    | 73%       | 46                           | 41%             |
| CSE2220     | Signal Processing                      | 89                     | 60%       | 28                           | 71%             |
| CSE2310     | Algorithm Design                       | 499                    | 67%       | 171                          | 70%             |
| CSE2115     | Software Engineering Methods           | 411                    | 90%       | 75                           | 100%            |
| CSE2525     | Data Mining                            | 242                    | 58%       | 126                          | 72%             |
| CSE2425     | Embedded Software                      | 112                    | 86%       | 25                           | 96%             |
| CSE2225     | Image Processing                       | 71                     | 80%       | 14                           | 100%            |
| CSE2120     | Concepts of Programming Languages      | 452                    | 58%       | 234                          | 74%             |
| CSE2315     | Automata, Computability and Complexity | 472                    | 41%       | 364                          | 51%             |
| CSE2530     | Computational Intelligence             | 248                    | 96%       | 26                           | 88%             |
| CSE2430     | Operating Systems                      | 106                    | 85%       | 16                           | 63%             |
| CSE2230     | Multimedia Analysis                    | 64                     | 75%       | 21                           | 71%             |
| CSE2000     | Software Project                       | N/A                    | N/A       | N/A                          | N/A             |

Table 4: Pass rates CSE Year 2

### 4.2.3 Year 3

The student panels for the third year are always quite hard to fill. This year there were about 2 students for each of the electives during the midterm evaluation and 2-6 for each elective during the

endterm evaluation. The electives of the third year were evaluated quite positively. Students liked that they could choose their own courses and thought there was a good variety of electives to choose from. However, some students would have liked to see more AI, since there is almost no AI in Collaborative Artificial Intelligence. The curriculum committee is looking into adding more AI in the bachelor program for the curriculum change in 2024-2025.

**Algebra and Cryptography.** There has been a staff change for this course and this has improved the Algebra part of the course. However, the Cryptography part was still a bit less well organized. Next year, this course will be replaced by a new course called Computer Security. This course aims to include topics such as an computer, system and network security, as well as applied cryptography.

**Collaborative Artificial Intelligence.** Students liked the course, however the codebase for mainly the second assignment was a bit of a mess, which resulted in students spending most of their time on figuring out the code instead of working on the assignment. The course staff will focus on improving assignment 2 for the next iteration of the course. They will recruit TAs to help with improving the codebase.

| Course code | Course name                              | Number of participants | Pass rate | Number of participants resit | Pass rate resit |
|-------------|--|------------------------|-----------|------------------------------|-----------------|
| CSE3100     | Functional Programming                   | 208                    | 68%       | 58                           | 69%             |
| CSE3130     | Introduction to Quantum Computer Science | 104                    | 63%       | 51                           | 69%             |
| CSE3210     | Collaborative Artificial Intelligence    | 249                    | 91%       | 40                           | 100%            |
| CSE3230     | Algebra and Cryptography                 | 117                    | 91%       | 19                           | 63%             |
| CSE3300     | Algorithms for NP-Hard problems          | 130                    | 95%       | 20                           | 85%             |
| CSE3500     | Human Computer Interaction               | 271                    | 94%       | 20                           | 95%             |
| CSE3000     | Research Project Q2                      | 34                     | 97%       | N/A                          | N/A             |
| CSE3000     | Research Project Q4                      | N/A                    | N/A       | N/A                          | N/A             |

Table 5: Pass rates CSE Year 3

### 4.3 Minors

The student panels of the minors Computer Science and Engineering with AI took place in week 2.8 and 2.7 respectively. They were promoted through a Brightspace post by the minor coordinators. The Commissioner of Computer Science Education Affairs wrote this post and also included the link to the registration form. The minor coordinators also promoted the student panels at their courses. This form of promotion seemed to have worked well.

#### 4.3.1 Computer Science

For the minor Computer Science student panel, there were 11 registrations. Eventually 10 of these people showed up, which was a good amount for a student panel. Overall the students were quite positive about the minor. For non-Delft students, the beginning of the minor was quite confusing as they didn't get an introduction mail or an announcement. Half of the students indicated that they would like to have a welcome session. This was done in previous years, however, it was removed since it wasn't visited much. The minor coordinator will look into bringing it back or sending a welcome mail.

**Visual Data Processing** There was a remark about the course using an inappropriate image as an example in the slides. It was a picture of the face of a woman, but on the whole picture she is naked on the cover of a Playboy magazine. The Commissioner of Computer Science Education Affairs addressed this to the Director of Studies and he contacted the course instructor, who will remove the image from the slides.

*\* These courses are given for both the minors, thus the numbers contain the students from both minors.*

#### 4.3.2 Engineering with AI

This year there was a slight change in the curriculum of the minor. The course Introduction to AI and Engineering Responsible AI was moved from the first quarter to the second quarter and Introduction to

| Course code | Course name                         | Number of participants | Pass rate | Number of participants resit | Pass rate resit |
|-------------|-------------------------------------|------------------------|-----------|------------------------------|-----------------|
| TI3105TU    | Introduction to Python Programming* | 206                    | 72%       | 54                           | 50%             |
| TI3111TU    | Algorithms and Data Structures*     | 176                    | 49%       | 98                           | 82%             |
| TI3115TU    | Software Engineering Methods        | 165                    | 99%       | N/A                          | N/A             |
| TI3130TU    | Data Analytics                      | 135                    | 72%       | 34                           | 79%             |
| TI3135TU    | Visual Data Processing              | 130                    | 87%       | 13                           | 84%             |
| TI3715TU    | Game development project            | 42                     | 100%      | N/A                          | N/A             |
| EWI3615TU   | Data Technologies Project           | 90                     | 100%      | N/A                          | N/A             |

Table 6: Pass rates minor Computer Science

Machine Learning was moved from the second quarter to the first quarter. For the minor Engineering with AI student panel, there were 7 registrations and 6 of those eventually showed up.

Overall the students were positive about the minor and thought it was very relevant and applicable in their own field. Most feedback was on Algorithms and Data Structures (ADS). Just like last year, most students felt like this course did not fit with the learning objectives of the minor and thought it was a difficult course. This could explain why the pass rate for the course is quite low, which can be seen in table 6 and 7. Students also thought that 10 ECTS for the Capstone Applied AI Project was a bit too much. They would have liked to have a course next to it, so the information learned in that course could be applied in the project. The good news is that next year, there will be changes in the curriculum of this minor. ADS will be removed and the Capstone Applied AI Project will be reduced to 5 ECTS. Two new courses will then be introduced to the minor: Natural Language Processing and Deep Learning

| Course code | Course name                                       | Number of participants | Pass rate | Number of participants resit | Pass rate resit |
|-------------|---|------------------------|-----------|------------------------------|-----------------|
| TI3105TU    | Introduction to Python Programming*               | 206                    | 72%       | 54                           | 50%             |
| TI3111TU    | Algorithms and Data Structures*                   | 176                    | 49%       | 98                           | 82%             |
| TI3145TU    | Introduction to Machine Learning                  | 62                     | 89%       | 6                            | 100%            |
| TI3140TU    | Introduction to AI and Engineering Responsible AI | 59                     | 98%       | 1                            | 100%            |
| TI3150TU    | Capstone Applied AI project                       | 60                     | 100%      | N/A                          | N/A             |

Table 7: Pass rates minor Engineering with AI

## 4.4 MSc Computer Science

### 4.4.1 Focus group

There were around 30 students present at the first focus group. The master programme coordinator, Merel Zaat, created a Mentimeter where students could rate the courses and give feedback in 3 words. After that, there was also time for an open discussion for each course. This worked quite well and good feedback was given. The Mentimeter made it easy to get a clear overview of which courses were well received by students and which were not. The Commissioner of Computer Science Education Affairs thinks it is a nice way to discuss many courses with many students in a short amount of time.

The second focus group was less well visited. There were probably around 8 students present, so the promotion should be done better. This can be done by hanging up posters, going to lectures and sending messages in the Whatsapp group chats. This will be emphasized to the upcoming the Commissioner of Computer Science Education Affairs.

**Machine Learning 1.** There was quite a lot of feedback on this course and the students gave it a low score. Students felt like it was only theory and they weren't taught any application of the theory. They also felt that the course felt disconnected. There was no connection between lectures and assignments and there was also no transition between the topics. The course has been evaluated poorly before and there still hasn't been anything done about it. The Commissioner of Computer Science Education Affairs will discuss this matter with the Director of Studies and programme coordinator to see how the course can be improved.

#### 4.4.2 Security and Cryptography

During the first quarter, a few students came to the Commissioner of Computer Science Education Affairs to discuss some complaints about Security and Cryptography. It started with a Brightspace announcement stating that possible fraudulent cases were detected and that action would be taken. However, the announcement did not specify any course of action and/or status on the cases. This created some unease among the students and left the situation very unclear.

Next to this, there also was some miscommunication on the Mattermost TA channel. A student tried to inform the lecturer (Zekeriya Erkin) of a possible mistake when said lecturer shared a screenshot of a partial exam question on a public channel. However, the lecturer never responded to any of the messages. After the exam, another student made a comment on Mattermost about this matter, since the exam contained the question that was shared (and thus the TAs that were in the channel had an advantage). This time, the lecturer immediately responded asking who was responsible for the student being in the channel and who the ‘leader’ of the group was. The situation escalated with some messaging back and forth between the lecturer and the student until it ended with the message: ‘Now I have to cancel the question’. After this, the lecturer made an announcement on Brightspace asking all TAs that have access to the Mattermost channel to send their full names and student numbers to the staff. This announcement and the communication on the Mattermost channel made it seem to the students that the lecturer put all responsibility of this mistake with the students instead of with him or the course staff. Students also felt that this stance did not promote a safe working environment where students and researchers work towards better education together.

There were also some other concerns regarding the exam. There was a change in a question during the exam, which was not communicated clearly (it was only announced vocally at the front row of the hall) and it was not propagated through the Weblab announcements. Students were also still able to access the exam after leaving the examination hall.

All these incidents and the way the lecturer responded to questions/feedback resulted in the students not feeling safe enough to ask questions and point out mistakes. The group of students that came to the Commissioner of Computer Science Education Affairs wrote a letter explaining the situation and sent that to the Director of Studies. The Commissioner of Computer Science Education Affairs also discussed this with the Director of Studies and read the letter before it was sent to him.

The Commissioner of Computer Science Education Affairs also got a complaint from an anonymous student via the Feedbacktool. They described the professor as ‘mentally abusive’. The student explained that the professor was reluctant to answer questions from students and that he often mocked students. The student stated that they did not feel safe in his class.

The Commissioner of Computer Science Education Affairs discussed the problems with the Director of Studies (both the letter and the complaint from the Feedbacktool) and he had a talk with the lecturer. During this meeting it became clear that the lecturer never had any ill intent and that he just did not communicate well. After this meeting, the said lecturer also had a talk with a few of the students who wrote the letter. Following this, a response letter was written by the master programme coordinator and the Director of Studies. This letter contained the responses to the several problems that the students addressed in their initial letter. The lecturer will take all the feedback into account and try to communicate better in the future.

#### 4.4.3 Seminar Cybersecurity

Towards the end of the fourth quarter, the Commissioner of Computer Science Education Affairs received a lot of complaints about CS4120 Seminar Science and Methods in Cyber Security. The course is organized by professor Mauro Conti, but most lectures are given by other staff members. In the first lecture, the students were told that there would be assignments and an essay. They waited for more information on this, emailed the professor multiple times, but he could not be reached for multiple weeks. In week 7, they finally got some answers to their questions regarding the assignments and the essay after the Director of Studies was informed about the situation and emailed the professor. The professor posted a Brightspace announcement with some information about the essay, however, it was still vague and the deadline was already in 2 weeks from the announcement. The students still felt that the exact

requirements, such as the kind of topic and kind of essay, were unclear after the announcement. To start on the essay, the students also needed to get approval on their topic. However, since the professor took weeks to reply to students, they had to wait a long time for the approval and could not start on time. Next to this, when the students received the assignments, the deadline for this was also about a week later already.

A group of students sent a complaint to the Director of Studies and the Commissioner of Computer Science Education Affairs also discussed the matter multiple times during their meetings. The Director of Studies had a talk with the professor and he moved up the deadline of the essay. The problem was also discussed with the program coordination and they have taken the feedback seriously. They are working with the chair of the research group Cyber Security to improve the course organization for next year and this also includes that a different lecturer will take over the role of professor Conti as the responsible instructor next year. This was also communicated to the students who sent the complaint email.

## A Book resale interest

### Book resale interest

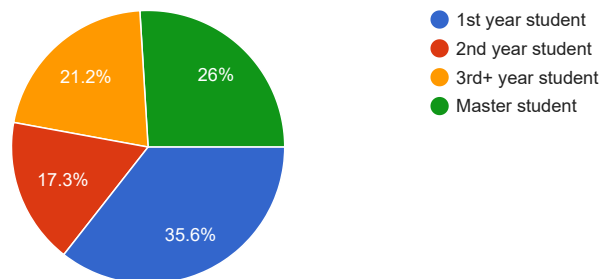
104 responses

[Publish analytics](#)

How far are you in your studies?

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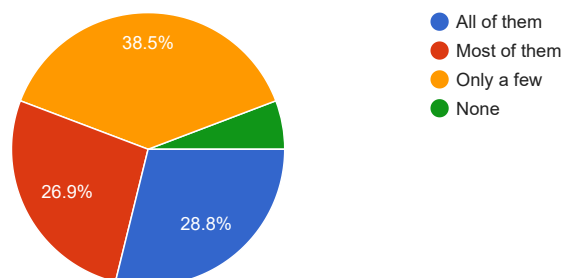
104 responses



How many study books have you bought for your studies?

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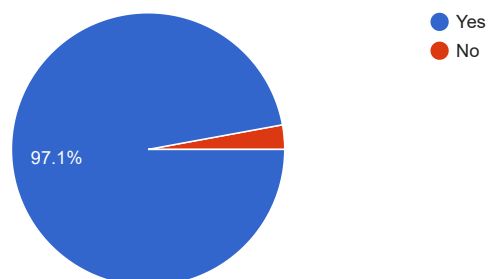
104 responses



Are you interested in a resale system for old study books?

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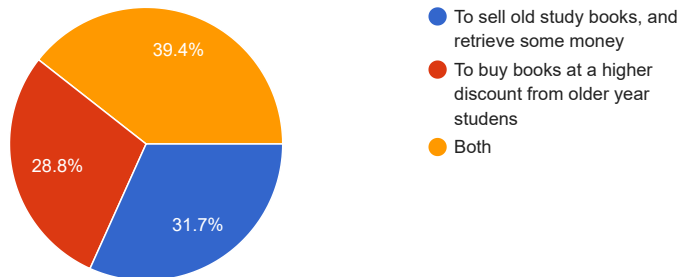
104 responses



What would be the primary reason for you to use a book resale system?

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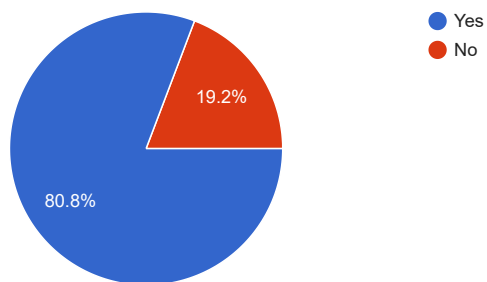
104 responses



Would you be okay with the association fixing the resale price in order to not create a competitive market?

 Copy

104 responses





Why did you answer yes or no to the previous question? (optional)

42 responses

I think this would artificially keep the price high, maybe set a price ceiling instead

Because some books are of better quality than others.

Win win situatie ookal zijn de prijzen fixed

Because otherwise students with more money to spend, get the books, because they bid higher.

Competing in free markets are fun

Easier for everyone

I wouldnt sell them myself

Wouldnt sell them myself

Because some books might not be in the same condition as others

Its fair to do so

No, because then I can maybe find another resaler that has it cheaper

saves me money

Because not every book is from the same quality

Fair market values

Because the value of the book strongly depends on the state it is in. A book that is not used has more value than one that is a bit damaged. CH could offer guidelines for prices. Also I don't think competitiveness would be so much of a problem. I think the demand is higher than 'aanbod' ;-)

Dat is eerlijk

Makes it easy and fair

It depends on how well kept the book is.

Ik heb niet een heel specifieke voorkeur, als jullie een prijs bepalen is het natuurlijk ook goed. Maar vraag en aanbod met boeken lijkt me ook handig :)



Not everyone takes good care of their books, it is unfair to sell a secondhand book that is in bad state at the same price as a book which is in good state. If you can ascertain the quality, then I'd yes.

If there wouldn't be a fixed pricing, there would hardly be any difference with any other vendor (other than the profit margins).

Liberal market reserves fair prices. Often, study associations focus on new students, trying to make the books as cheap as possible leaving an unfair interest for the owner. Secondly, there will be no control whether the full paid price will be received by the seller or whether the association takes an unfair share.

If I were to sell my study books, I'd like to receive an amount of money that is at least similar to what I paid for my books.

It would be easier to have a set price, less things to think about.

I think the old books are not used anyways, so selling them is more important. I do expect that this benefits everybody however, as the seller would have gotten the book for a lower price also by using this process.

Otherwise people will sell their books for a lot of money anyway.

Free market capitalism is pretty effective I've heard

I think it's the fairest

If the price is fixed, there will be no bidding war/selling war.

This would require the board to set the price, which doesn't seem like their responsibility

Ik ben het er wel mee eens dat je geen competitieve markt wil. Maar sommige mensen (waaronder ik zelf) schrijven soms iets in hun boek. Daarnaast kan kwaliteit van ene boek meer of minder zijn. Als je daar een oplossing op weet dan is een prefixed prijs voor mij prima.

Because I hadn't thought of it but I think it's a good idea (suf). If you want to sell for a higher price, you need to do it yourself

Blijft eerlijk

Yes, but only if it is a reasonable price

Easier to resell

It seems fair to set prices based on the book condition and usefulness (newer editions will be more useful and I would say therefore more expensive than old ones) and I would like to entrust that judgement to the association to create a fair, non-competitive system. Creating marketing competition can cause more urgency and stress between sellers and buyers (some



people might try to time their sells better to get more profit, but this might be worse for the buyers). I don't think we need competition in the availability of study materials.

To prevent flipping lol

Id rather be able to sell them easily for a little then not at all. Same for buying I guess

Scheelt een hoop gedoe.

You can fix the price but I think it would not work to the benefit of the system.

A competitive market is key to land at the optimal price for each book, at which sellers are willing to sell and buyers are willing to buy. If you fix the price, either buyers will not engage or sellers will not offer. A competitive market is a good market. I think that the resale market already has benefits over alternatives like Marktplaats or Bookmatch because of the homogeneous goods (almost everyone has the same curriculum) and the lack of shipping costs (since you can just exchange the books irl), and the lack of transaction fees.

As long as it is cheaper than 100 eur it is fine.

As long as books are reused, it doesn't matter the competition



Do you have any other remarks or suggestions about a book resale system?

30 responses

good idea

Since some books are not used anymore, it would be nice to have a list of books that you want to provide. I am not sure if you were planned to do this already.

Goed initiatief

Nope

Seems like a good idea

Im interested to know how it will influence the comitys relatjionship with the booksale companies

Ik wil me boeken houden en het liefst nieuw kopen dus het is net niet iets oor mij maar goed idee:)

Maybe a system wereld it doesnt cost you any money. That you Just Pay at the beginning and get all youre money back at the end.

Maybe you could fix a resale price in order to not create a competitove market. Bit then maybe you could make categories on how good the condition is of the book that they are buying. So a higher set price for a book in a better condition.

No

the "yes" depends on the state of the books

Keep us up to date! I have still some books laying around, just biting dust. Kind of a waste. So I would like to give them to new bachelor students!

Make sure to promote it such that everyone knows that it is there

Maybe a scaling for the condition of the book

lets vergelijkbaar met Marktplaats lijkt me handig

A whatsapp group with the people that are interested

With fixed pricing, consider different prices depending on the quality of the book.

The current pricing used for buying books through CH is very high in my opinion, causing me to just buy my study books through Marktplaats in my first year and to just use pdf-files in my second year. I'd really like the prices to be lowered if the resale system were to be used.



Goed bezig

There are already reselling systems online, how do you plan to compete with these? (In terms of attracting sellers, not buyers)

N.v.t.

Quality/usage adjusted pricing. If there is going to be fixed prices it does not make much sense to price an old coffee stained book as much as a relatively unused book.

Sounds like a great plan, if it existed in my first/second year, I would have gladly used it to buy books as the books are very expensive

I would incorporate different price points depending on the state of the book.

Great idea! Pls simple implementation fast :)

I wrote most of it in the previous question. Thanks for the initiative!

No :)

Would probs need some kind of quality checks as some books may not be in perfect condition.

Goed idee!

Good initiative!

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## B Book sale numbers

| Course  | Estimate | Ordered | Percentage of estimation | Study | Study | Year | Quarter |
|---|----------|---------|--------------------------|-------|-------|------|---------|
| Linear Algebra 1  | 75       | 65      | 86,67%                   | AM    | B     | 1    | Q1      |
| Linear Algebra 2  | 25       | 13      | 52,00%                   | AM    | B     | 2    | Q1      |
| An Introduction to Statistics                             | 50       | 29      | 58,00%                   | AM    | B     | 2    | Q1      |
| Introduction to programming                               | 15       | 7       | 46,67%                   | AM    | B     | 1    | Q2      |
| Analysis 1  | 10       | 1       | 10,00%                   | AM    | B     | 1    | Q2      |
| Ordinary Differential Equations                           | 40       | 7       | 17,50%                   | AM    | B     | 2    | Q2      |
| Markov Processes, Introduction to Probability Theory      | 50       | 44      | 88,00%                   | AM    | B     | 2    | Q3      |
| Numerical Methods 2                                       | 10       | 1       | 10,00%                   | AM    | B     | 3    | Q3      |
| Advanced Probability                                      | 5        | 1       | 20,00%                   | AM    | B     | 3    | Q3      |
| Complex Function Theory                                   | 5        | 9       | 180,00%                  | AM    | B     | 2    | Q4      |
| Mathematical Structures                                   | 90       | 90      | 100,00%                  | AM    | B     | 1    | S1      |
| Real Analysis   | 50       | 24      | 48,00%                   | AM    | B     | 2    | S1      |
| Partial Differential Equations                            | 30       | 5       | 16,67%                   | AM    | B     | 2    | S2      |
| Martingales, Brownian Motion                              | 5        | 2       | 40,00%                   | AM    | M     | N/A  | S1      |
| Introduction to Financial Mathematics                     | 5        | 1       | 20,00%                   | AM    | M     | N/A  | S1      |
| Extremal Combinatorics                                    | 5        | 0       | 0,00%                    | AM    | M     | N/A  | S1      |
| Introduction to Quantum Information and Computing         | 5        | 2       | 40,00%                   | AM    | M     | N/A  | S1      |
| Perturbation and Variational Methods for PDE's            | 5        | 3       | 60,00%                   | AM    | M     | N/A  | S1      |
| Relaxations and Heuristics                                | 5        | 0       | 0,00%                    | AM    | M     | N/A  | S1      |
| Advanced Topics in Probability                            | 5        | 1       | 20,00%                   | AM    | M     | N/A  | S1      |
| Non-linear Differential Equations                         | 10       | 3       | 30,00%                   | AM    | M     | N/A  | S1      |
| Systems and Control                                       | 5        | 1       | 20,00%                   | AM    | M     | N/A  | S1      |
| Risk Management   | 5        | 1       | 20,00%                   | AM    | MI    | 3    | Q1      |
| Object Oriented Scientific Programming C++                | 5        | 0       | 0,00%                    | AM    | MI    | 3    | Q1      |
| Numerical Methods for Differential Equations              | 10       | 1       | 10,00%                   | AM    | MI    | 3    | Q1      |
| Parallel Computing  | 10       | 0       | 0,00%                    | AM    | MI    | 3    | Q1      |
| Time Series - Forecasting                                 | 5        | 2       | 40,00%                   | AM    | MI    | 3    | Q1      |
| Time Series - Analysis                                    | 5        | 1       | 20,00%                   | AM    | MI    | 3    | Q1      |
| Risk Management   | 5        | 1       | 20,00%                   | AM    | MI    | 3    | Q2      |
| Data science for Finance                                  | 5        | 0       | 0,00%                    | AM    | MI    | 3    | Q2      |
| Option Valuation Methods                                  | 5        | 2       | 40,00%                   | AM    | MI    | 3    | S1      |
| Introduction to Mathematical Finance (1)                  | 10       | 4       | 40,00%                   | AM    | MI    | 3    | S1      |
| Introduction to Mathematical Finance (2)                  | 10       | 4       | 40,00%                   | AM    | MI    | 3    | S1      |
| Principles of Asset Trading                               | 5        | 2       | 40,00%                   | AM    | MI    | 3    | S1      |
| Computer Organisation                                     | 75       | 40      | 53,33%                   | CS    | B     | 1    | Q1      |
| Computer Graphics   | 10       | 3       | 30,00%                   | CS    | B     | 2    | Q1      |
| Signal Processing   | 10       | 4       | 40,00%                   | CS    | B     | 2    | Q1      |
| Calculus  | 30       | 6       | 20,00%                   | CS    | B     | 1    | Q2      |
| Web and Database Technology                               | 20       | 2       | 10,00%                   | CS    | B     | 1    | Q2      |
| Algorithms and Data Structures                            | 30       | 5       | 16,67%                   | CS    | B     | 1    | Q2      |
| Algorithm Design  | 20       | 5       | 25,00%                   | CS    | B     | 2    | Q2      |
| Linear Algebra  | 10       | 1       | 10,00%                   | CS    | B     | 1    | Q3      |
| Automata, Computability and Complexity                    | 5        | 0       | 0,00%                    | CS    | B     | 2    | Q3      |
| Operating Systems   | 5        | 0       | 0,00%                    | CS    | B     | 2    | Q3      |
| Computational Intelligence                                | 5        | 0       | 0,00%                    | CS    | B     | 2    | Q3      |
| Functional Programming                                    | 10       | 2       | 20,00%                   | CS    | B     | 3    | Q3      |
| Software Quality and Testing                              | 5        | 2       | 40,00%                   | CS    | B     | 1    | Q4      |
| Probability Theory and Statistics                         | 10       | 2       | 20,00%                   | CS    | B     | 1    | Q4      |
| Computer Networks   | 10       | 2       | 20,00%                   | CS    | B     | 1    | Q4      |
| Quantitative Performance Evaluation for Computing Systems | 5        | 0       | 0,00%                    | CS    | M     | N/A  | Q1      |
| Selected topics in molecular biology                      | 5        | 0       | 0,00%                    | CS    | M     | N/A  | Q1      |
| Medical Visualization                                     | 5        | 0       | 0,00%                    | CS    | M     | N/A  | S1      |
| Multivariate Data Analysis - Probability                  | 5        | 0       | 0,00%                    | CS    | M     | N/A  | S1      |
| Multivariate Data Analysis - Machine Learning             | 5        | 0       | 0,00%                    | CS    | M     | N/A  | S1      |

Figure 1: Book sale numbers 2022/2024

## C Booksale research results

### Booksale research

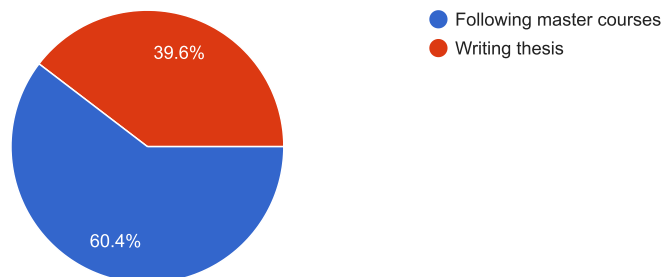
53 responses

[Publish analytics](#)

What is your study progress?

 Copy

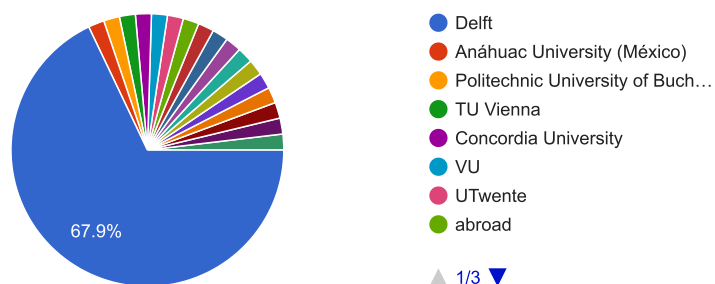
53 responses



Where did you get your bachelors diploma?

 Copy

53 responses

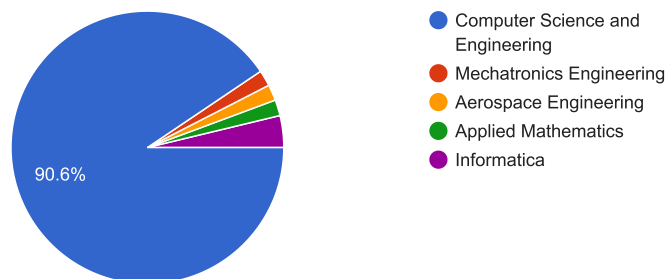


▲ 1/3 ▼

For what study did you acquire your bachelors diploma?

 Copy

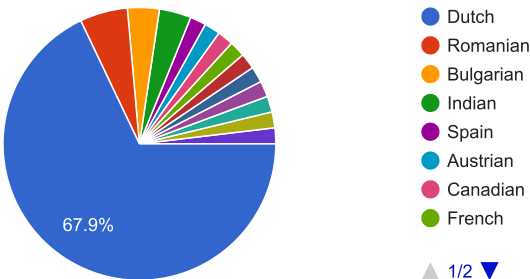
53 responses



What is your nationality?

 Copy

53 responses

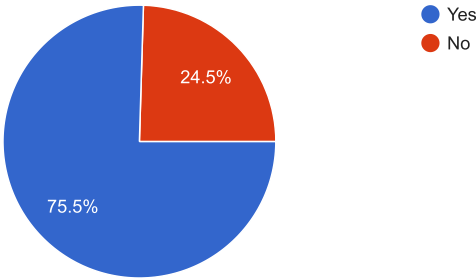


Books

Did you buy a book during your bachelor program?

 Copy

53 responses





If yes, for which course(s)

40 responses

Most of them

Computer Networks

Calculus, Computer Organization

All first year courses

Almost all first year courses. Not for second and third year except algorithm design

OOP, Algorithm Design

Bought all the books for year 1, quarter 1

Computer Organization, Numerical Methods for Differential Equations (minor Computational Science & Engineering course)

Linear Algebra and Analysis

All of them (but most of them, I did not read)

CO, CN

All courses

OOP

1st year courses

Computer organization and OOP

Computer Organisation, Calculus

OOP, Computer Organization

Mainly the mathematics courses

Mathematic, discrete mathematics, computer architecture, artificial intelligence, networking,

Basically the books for Q1Y1: Reasoning&Logic, Computer Organisation, Intro to OOP

Computer Organization, Reasoning & Logic, Java in Two Semesters



Calculus, Discrete Math

OOP, Calculus

Y1Q1 courses

CO, OOP, Reasoning and logic, calculus

Calculus, Linear Algebra, Probability Theory & Statistics, Computer Networks, Computer Organisation

Calculus, Linear Algebra, Algorithms and Datastructures, Computer Graphics

Programming 1, Object-oriented programming

ADS, CN, AD

reasoning and logic, computer organisation, OOP, Calculus, Web and database technology, linear algebra, probstat, algorithms and datastructures, computer networks

Calculus, Linear Algebra, ACC

Wiskundige Structuren

Numerical methods for partial differential equations

CO, OOP, WDT, ADS and Calculus

First 2 quarters of year 1 I think

Calculus, PTaS, Linear Algebra

Nearly all

Computer Architecture and Organization

Basically all courses from the first year and quarter 1 of the second year of the 2017 CSE curriculum

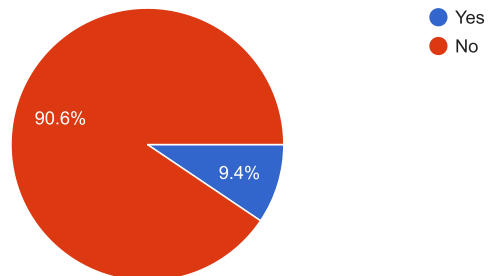
Calculus, introduction to programming languages



Did you buy a book during your master program?

 Copy

53 responses



If yes, for which course(s)?

6 responses

Machine Learning 1, Security and Cryptography

Algorithms for Sequence Based Bioinformatics / Machine Learning

-

Multivariate data analysis and artificial intelligence techniques

Algorithms for sequence-based Bioinformatics

High Performance Computing, machine learning



### What was the reason for you to (not) buy books?

53 responses

They are expensive and used for 3 months (at most)

Good alternatives provided by course instructors

I can download them

Expensive and not even used in courses.

After the first year, I realized that I usually do not need the books since the lectures and online resources are enough. In the rare case that I do need the book, usually someone shared a pdf of the book in a WhatsApp group.

Online pdfs exist for most books

Either the books were easy to download and not heavily used or their were no books for the course to buy

In the beginning I just did what I thought I had to do. Later I just downloaded whatever I thought was needed.

They are not necessary, and if they are there are pdfs available

CO was the first quarter, purchased to see if I prefer physical or online books. Afterwards, found out I am fine with online versions of the books, except for the minor course with a lot of equations.

not necessary, every book was available online

Because I realized that they cost a lot of money, while the courses usually did not really use them.

courses did not list books that you need to buy, most material is provided in brightspace

Often, courses focus more on papers as reading material and barely refer to a book during the slides, whereas the bachelor at times tends to follow a book outline partly.

I just find them online or via the library.

pdf and didn't know they sold master program books

Found pdf online or book wasnt that useful

Every book was online available as PDF



I use the PDF versions.

More expensive than other sources

The lecturers don't really use any books for the courses I follow (only as extra material to study)

Waste of money, I can get them online or tbh don't need them at all

Open book tests, the amount of material from the book covered or required, the price of the book, whether it is interesting/useful

Because they are expensive and TU Delft (through the library plugin) makes all e-books freely accessible online anyway. The courses that are in my IEP also don't require one to know the contents of chapters for the exam. The books are mostly supplementary material on top of lecture material and tutorials, which is what I prefer.

Everything's available online, books are expensive and heavy

I did not feel like I needed them.

Need to sell them afterwards

Haven't needed one after Y1Q3

Too expensive and wouldn't use them, slides are always enough. And if needed easily found online

Most of the material was available online, physical books cost quite a lot of money and take up quite a bit of space.

In my first year I thought it would improve my ability to study compared to a digital version. Turns out that a PDF version from the high seas works fine, and is a lot cheaper & lighter. Now I own a Remarkable 2, which for me mimics a real book in areas a PDF still lacks.

PDF was available.

Everything that's needed is digitally available, saving me money

Prefer material on paper

For most courses following the lectures is more than enough.

Most courses don't rely on books; you can study fine with just the slides and the internet. Papers (published, recent research) are generally more important as an external resource and these can be found online.



None were really recommended as core material for a course.

Wasn't required for any course

Unsure if I'm committed to a course, PDF works fine

I can get PDFs for free online

books are too expensive for my budget

Most were unnecessary, all the content was in the slides

PDFs are better

Could find pdfs for free/didn't need the book

Most information was found in papers/readers and I did not feel the necessity to buy the books as oftentimes the information was available via online resources (e.g. the library access to certain pdfs)

Was not really needed as a pdf was usually found within a few minutes

Courses didn't seem to require buying them

Because they were a useful addition to the course

Needed for exercises

Pdf

Expensive

All information can be found online or the teachers provide a PDF, which is more than satisfactory as buying books for CS is expensive and you use them seldomly

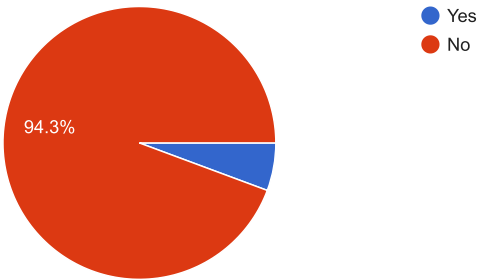
I haven't needed them in many courses. And if I did need them there was an ebook for free



Last quarter, the study association did not sell any books for the master program, did you miss it?

 Copy

53 responses



### Why did you (not) miss it?

53 responses

I would have been interested in buying one book

Good alternatives provided by course instructors

I didn't know about it

I didn't need any books

I didn't need any books.

I didn't need any book

I didn't want to buy books

Did not need books during my master

Didn't need books

Not planning on buying books

not necessary

Because the courses usually did not really use the book, but used them more like "additional reading"

Books were not needed

I did not receive an email, otherwise I would have checked it out

I find them online anyway. Physical books are too expensive usually.

thought it was only for bachelor

I don't understand the question, what do you mean did I miss it. Like did I wish the association sold books for the master's program? No, I wouldn't have bought any anyway

Books were online or course didn't use a book

Wasn't planning on buying any of them anyway.

Libgen

Not necessary





Waste of money

Last quarter I wasn't in the Netherlands, Normally I check it out.

Because after I discovered that physical books in (Y1Q2) are not used in any form during courses, I might as well save some money by switching to free e-books containing the same information.

See above

I was not buying books anyway.

-

Didn't need to buy any

Reasons stated before as to why I don't buy books

Because of the above reasons i was not looking to buy any books

I didn't intent to buy any.

Cuz I never bought one.

I only use digital resources to save money, effort and paper

Interested in buying Machine Learning books

Didn't even know there was such a book selling.

As stated before, the master courses don't rely on books so much.

None of the courses I've taken needed any books.

I didn't need to buy any books

PDF works fine too

Did not buy any books

i usually don't buy books

I didn't follow any courses last quarter

I don't usually buy academic books



Wasn't taking any cs courses

Mostly because I started my master thesis last quarter but I only buy the books if the only option is to acquire them physically

As mentioned used pdf's if required or course provided content, such as slides

There was no need to buy them according to the courses themselves.

None of my courses required me to buy books

Did not need to buy any books

PDF

The collection didn't have what I wanted

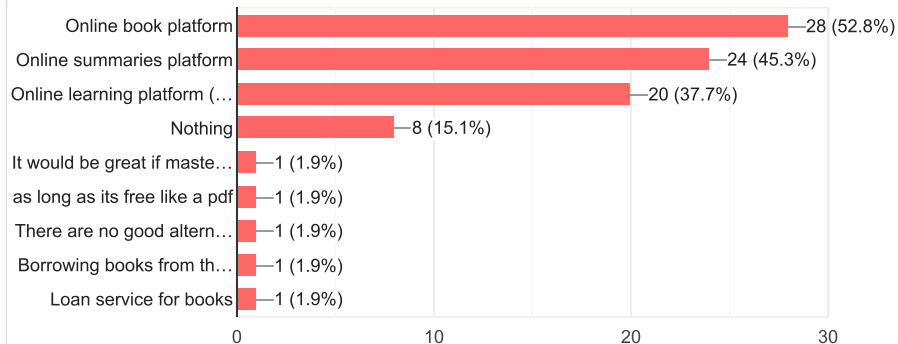
I have not bought a single book from CH for my masters

Would not have gotten them anyway

What would you like to have as an alternative to books?



53 responses



Do you have any other remarks or suggestions?

10 responses

Most of the books are shared amongst students as PDF files

An online learning platform would be great, I remember there was this unofficial one called smips.nl and it really helped me a lot.

Here is the archived version: <https://web.archive.org/web/20191024211834/smips.nl/home>  
It gave you x amount of questions from previous exams and you could enter answers to check if you are correct.

So if something like that could be made by CH that would be a great help.

We have an online book platform called libgen, and an online summaries platform called cshub. So an online learning platform would be cool

Keep selling books for masters. I have been unable to purchase books through CH because they were unavailable and had to buy them through other vendors.

Make students aware of the library plugin that's offered by TU Delft, because all papers and books that are usually behind paywalls become free-to-read and even download.

Reusing books, borrowing books would be much better

For me personally I just don't need additional material as nowadays slides are enough

A online summaries platform already exists with a lot of summaries for BSc courses, although it's no longer updated much. You can still find it here: <https://cshub.nl/>, with the code here: <https://github.com/finitum/CSHub>

I really liked the skill circuits in the bachelor. And in general I'd prefer to not have courses with books that barely have anything to do with the course.

In the bachelor I bought all books that I was told to buy, which I kind of regret as some were useless. In my master I am very selective before I buy a book, but those I buy are very useful. So canceling book sale altogether is maybe not a great idea.

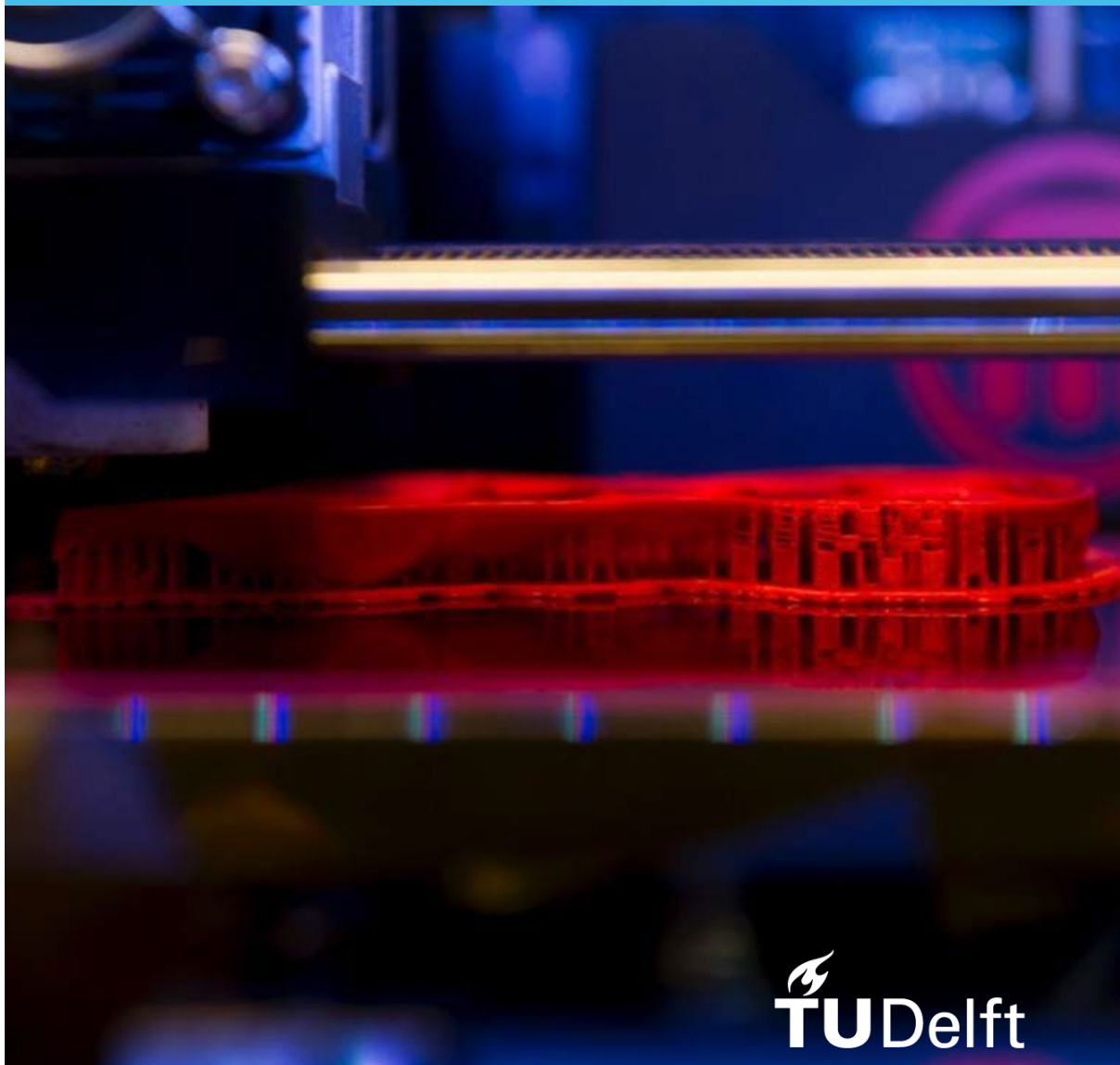
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## **D Regulation Matching & Selection Criteria and Procedure BSc Computer Science and Engineering**

Regulation Matching & Selection Criteria and Procedure  
BSc Computer Science and Engineering  
Academic year 2023/2024



## Preamble

The dean of the faculty of Electrical Engineering, Mathematics and Computer Science, having regarded Article 3 of the [TU Delft Selection and Placement Regulations](#) and after having received advice from the Faculty Student Council on 30 November 2022, establishes the following Regulation Matching & Selection Criteria and Procedure for the bachelor programme Computer Science and Engineering 2023/2024.

## Contents

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### 1. General Regulations

- 1.1. The execution of this regulation is appointed to the Committee Selection Computer Science and Engineering, hereafter referred to as the Committee.
- 1.2. The Executive Board of the TU Delft has set the maximum number of students for the academic year 2023/2024 at 550, taking into account Article 9, Clause 3 of the TU Delft Selection and Placement Regulations.
- 1.3. The Committee will, in accordance with the GDPR, only communicate about the participation of a candidate with that particular candidate.
- 1.4. Candidates who have been diagnosed with a learning disability and/or are experiencing extenuating circumstances can request extra time for the Cognitive Skills Tests, by contacting [selection-bsc-cse@tudelft.nl](mailto:selection-bsc-cse@tudelft.nl). Requests need to be supported with documentation in English or Dutch (e.g. a medical or psychological statement) and should be submitted not later than the 5<sup>th</sup> of February 2023. As this concerns private information, these requests will be handled by the academic counsellors, who can consult the Committee if necessary.
- 1.5. All dates are listed as dd/mm/yyyy. Times in this regulation are in Central European Time (CET), Dutch local time.
- 1.6. The entire matching and selection procedure and communication about this procedure is in English. One exception is made for the CST. Candidates who applied for the CSE Bilingual (Dutch-English) track will take the CST partially in Dutch. Candidates who applied for the CSE

English track will take the CST in English. Apart from answers to questions asked in Dutch in the CST, all candidates are required to answer all questions in English, as the BSc Computer Science and Engineering is either fully taught in English (English track) or mainly taught in English (Bilingual track).

## 2. Participating in the Matching and Selection Procedure

- 2.1. A candidate can only participate in the matching and selection procedure with a valid and fully *completed* registration request for the programme Computer Science and Engineering, via the Dutch national enrolment system for higher education entitled Studielink, before or on the deadline of January 15<sup>th</sup> 2023.
- 2.2. Candidates with a non-Dutch education diploma (≠VWO)<sup>1</sup>, must also register in Osiris ([osiaan.tudelft.nl](https://osiaan.tudelft.nl)) and submit a *complete* application package before or on the deadline of January 15<sup>th</sup> 2023 to enable them to participate in the matching and selection procedure.
- 2.3. The candidate is responsible to ensure that the email address used in the matching and selection procedure by the candidate is equivalent to the email address used for Studielink and is accessible until the start of the 2023/2024 academic year.
- 2.4. The candidate is responsible for checking messages in their inbox and spam folder during the entire matching and selection procedure, and making sure their inbox is able to receive emails sent out by the selection-bsc-cse email address.
- 2.5. Participating in the matching and selection procedure or receiving a ranking number, does *not* automatically mean that a candidate meets the stated educational prerequisites for admission. Verifying entry requirements, such as prior education, is outside the scope of the Regulation Matching & Selection Criteria and Procedure as well as the matching and selection procedure. Information about the entry requirements can be found on the admissions pages of the [TU Delft website](https://www.tudelft.nl).
- 2.6. A candidate can only participate once per academic year. The results of the matching and selection procedure are only valid for that particular matching and selection procedure which selects candidates for the upcoming academic year.
- 2.7. After the Studielink enrolment deadline of January 15<sup>th</sup> 2023, candidates are *not* allowed to switch language track during the matching and selection procedure. Candidates have to follow the procedure intended for the track for which they have registered in Studielink.
- 2.8. A candidate may participate up to three times in the matching and selection procedure of the BSc programme Computer Science and Engineering, regardless of the tracks they choose. An active request for enrolment in Studielink after January 15<sup>th</sup> 2023 will count as a selection opportunity, even if a candidate does *not* participate *nor* completes the matching and selection procedure.

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<sup>1</sup> Candidates should have a [secondary school diploma equivalent](#) to the Dutch pre-University diploma (=VWO).

2.9. Candidates who have previously been enrolled in the Computer Science and Engineering programme, but who have discontinued their studies due to a negative BSA are only allowed to re-apply for this programme after 4 years. These candidates have to (re-) participate in the matching and selection procedure, before being able to be re-admitted.

### 3. Selection Criteria

- 3.1. On the basis of the end terms of the programme the following three criteria have been distilled that form the basis for the selection for the bachelor Computer Science and Engineering:
  - 1. Mathematics
  - 2. Systematic Reasoning & Logical Thinking
  - 3. Algorithmic & Computational Thinking
- 3.2. Each element will be assessed with individual assignments or tests.
- 3.3. Several steps are defined to match and select candidates, some of which are *not* necessarily linked to a single selection criterion, but are part of the matching and selection procedure.

### 4. Matching & Selection Procedure

- 4.1. The matching and selection procedure consists of the following components:
  - 1. Motivation Questionnaire (MQ)
  - 2. Online Student Experience (OSE)
  - 3. Cognitive Skills Test (CST)
  - 4. Teamwork Assignment (TwA)
- 4.2. All components of the matching and selection procedure are mandatory and need to be completed in prescribed order, in order to proceed to the next component. The CST is graded and will determine candidates place in the ranking.
- 4.3. Candidates have to actively participate in all components of the matching and selection procedure, to receive a ranking number.
- 4.4. Those who fail to complete the steps of the matching and selection process within the stated time frames and before the deadline will be excluded from the matching and selection procedure. Candidates will not receive a ranking number and will have used a selection opportunity. Excluded candidates will be informed by e-mail within six weeks after the test period has ended.
- 4.5. The matching and selection procedure will take place online for all candidates. The CST will be proctored.
- 4.6. A single opportunity will be offered to take the CST on the TU Delft campus not proctored. If the amount of candidates exceeds the available seats for the campus CST day, seats will be randomly allocated among the candidates who choose this option.

- 4.7. If during the course of the Matching and Selection procedure logistic issues or health restrictions from the Dutch Government make it unfeasible to organize the CST on campus, candidates are responsible for arranging working equipment and a suitable environment to take the CST online and proctored.
- 4.8. Candidates who applied for the CSE Bilingual track will take the CST partially in Dutch. Candidates who applied for the CSE English track will take the CST in English.
- 4.9. The CST consists of the following three elements:
  - 1. Mathematics (30%)
  - 2. Systematic Reasoning & Logical Thinking (35%)
  - 3. Algorithmic & Computational Thinking (35%)Mathematics will count for 30% of the final selection score. Systematic Reasoning & Logical Thinking and Algorithmic & Computational Thinking will count for 35% of the final selection score.
- 4.10. By taking the online proctored tests, candidates agree upon making and monitoring video recordings, keystrokes, and screenshots. An examiner will have access to this data to judge if the tests were completed according to the regulations. Collected data will only be used for this purpose. The collected data will be destroyed if it is clear whether the candidate is admitted or *not* and the objection period has ended.
- 4.11. The candidate is responsible for assuring a well-functioning internet connection and VPN-connection (if needed).
- 4.12. The candidate is responsible for testing the functionality of their equipment and the proctoring software. The candidate will be able to take a practice test on the selection platform before the CST, to test if their equipment works. All equipment problems encountered during the practice test need to be resolved by the candidate.
- 4.13. Validating completion of the tests will be based on candidate's e-mail address.
- 4.14. Candidates are required to report any issues encountered that might affect the outcome of their score within 48 hours after they have occurred and before the deadline of that respective assessment or test period.
- 4.15. By participating in the matching and selection procedure candidates give consent that the TU Delft is allowed to share their name and email address with the team members they are assigned to for the teamwork assignment.
- 4.16. Candidates are not allowed to publish or share any of the questions and/or answers of the CST or other assignments with others or on the Internet. Candidates who are caught doing so will be excluded from the matching and selection procedure and will not receive a ranking number.

## 5. Fraud

- 5.1. The candidate will need to take the selection tests under standard (Dutch) exam regulations. This means that, among other things, candidates need to verify their identity using an official



photo ID, take the tests individually and without other sources of information. It is *not* allowed to communicate with others during the test by any means. When taking the selection tests online, candidates need to take the test in a quiet room; It is *not* allowed to have someone else in the room in which the test is taken nor is it allowed to have a radio or television playing in the background.

5.2. The following items are *not* allowed to be used during the tests:

- a) A calculator is *not* allowed *nor* is a calculator on a mobile device;
- b) Use of a second computer is *not* allowed;
- c) Use of a (smart) phone is *not* allowed;
- d) Use of any other mobile device than the device on which the test is taken;
- e) Use of headphones or earplugs is *not* allowed.
- f) Use of documentation other than the documentation permitted for the test.

5.3. The Committee will ask the candidate to cooperate in collecting evidence if a candidate is flagged with suspicious behaviour or is caught performing fraudulent behaviour. Grounds for suspecting fraud are any event or reasonable suspicion of irregularity, like: a) large-scale or organised fraud that renders the test results untrustworthy and where it is not (yet) possible to determine which individual candidates are involved; b) technical failure during the test that renders the results untrustworthy; c) extensive disruption during the test; d) the candidate fails to comply with test rules and instructions when taking or submitting the test. The suspected candidate will be interviewed and given the chance to respond in writing to the report of the Committee. During the investigation of the case, the candidate is allowed to finish the matching and selection procedure.

5.4. The Committee concludes whether rules have been violated or fraud has been committed. Candidates who have violated the rules will be penalized, with the sanction varying from being awarded zero points on the specific section of the tests to exclusion from the entire matching and selection procedure, depending on the severity of the rule violation. The decision about the rule violation and the corresponding sanction will be made by the Committee on behalf of the Dean. Candidates who have committed fraud will be penalized, with the sanction being exclusion from the entire matching and selection procedure. The decision about the fraud will be made by the Committee on behalf of the Dean.

5.5. A candidate who is excluded on the basis of fraud or rule violation, will be excluded from the matching and selection procedure of that particular year only. The candidate does *not* receive a ranking number and is considered to have used up a participation opportunity. A candidate can object to this decision<sup>2</sup>.

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<sup>2</sup> In accordance with the General Administrative Law Act (Algemene Bestuurswet) you may [object](#) to this decision within six weeks after the announcement to the Executive Board (CvB). You can submit your objection by sending it as a PDF attachment to [JZ@tudelft.nl](mailto:JZ@tudelft.nl).

## 6. Establishing the outcome of the matching and selection procedure and ranking

- 6.1. The obtained ranking number is only valid for the selection and admission procedure preceding that specific academic year. It is *not* possible to use your ranking number for later academic years if you de-register before the 1<sup>st</sup> of September, unless severe personal circumstances occur. If the latter is the case, a candidate can submit a substantiated request for an exemption to [selection-bsc-cse@tudelft.nl](mailto:selection-bsc-cse@tudelft.nl). This request will be evaluated by the Committee.
- 6.2. The ranking score of a candidate is determined by the final scores, which is based on the elements as stated in Article 4.9. A separate sub-ranking is made for both tracks. The test scores of candidates of a track are compared to the final scores of the other candidates within that same track, so-called z-scores. Higher final test scores lead to a better placement in the sub-ranking of a track. The candidate with the highest final score receives the highest spot in the sub-ranking, the candidate with the second highest final score receives the next spot in the sub-ranking, et cetera.
- 6.3. If two or more candidates qualify for the same sub-ranking spot, the score on the Systematic Reasoning & Logical Thinking element determines the order in which these candidates are placed in the sub-ranking. If this is not sufficient to determine the order, the placement relative to each other will be assigned by lot.
- 6.4. If both tracks have an equal amount of candidates, the final ranking is alternately filled with the candidates from both sub-rankings, starting with the candidate that has the highest placement in the sub-ranking and until all candidates have received a ranking number. A higher placement in the sub-ranking, will result in a better (=lower) ranking number.
- 6.5. If the number of candidates in the tracks differ by more than 10%, a threshold will take effect for the sub-ranking of the smallest track.<sup>3</sup> All candidates with a final score below the threshold, will be transferred to the sub ranking of the largest track, based on their absolute final scores. After the transfer is complete, the final ranking is alternately filled with candidates from both sub-rankings, starting with the candidate that has the highest placement in the sub-ranking and until all candidates have received a ranking number.
- 6.6. The ranking number will be ascertained by the Committee. The Committee will not correspond about the outcome. A candidate can object to their received ranking number<sup>4</sup>.

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<sup>3</sup> The threshold will be the minimum CST score obtained by the top 80% of candidates who completed the CST in last year's selection procedure.

<sup>4</sup> In accordance with the General Administrative Law Act (Algemene Bestuurswet) you may [object](#) to this decision within six weeks after the announcement to the Executive Board (CvB). You can submit your objection by sending it as a PDF attachment to [JZ@tudelft.nl](mailto:JZ@tudelft.nl).

## 7. Announcement of ranking number and further procedure

- 7.1. Candidates who have completed the matching and selection procedure will receive their final ranking number on the 15<sup>th</sup> of April 2023 through Studielink.
- 7.2. Candidates will receive a final standardized Z-score of their track, calculated over all three elements of the selection test (Article 4.9.), after they have received their ranking number. No further feedback on the scores will be provided. For reasons of confidentiality and objectivity we will *not* communicate about the method and evaluation of the criteria, *nor* is it possible to review the tests or individual answers given.
- 7.3. When a candidate is offered a place for the bachelor programme Computer Science and Engineering, the candidate has 14 days to accept this offer in Studielink. In case this offer is *not* accepted in Studielink within that time frame, the reserved spot will be made available for the next candidate with a ranking number who is waiting in line and has not received an offer yet.
- 7.4. Non-EU/non-EFTA candidates that need a visa/residence permit in order to enter the Netherlands, can only be supported in their application procedure by the Contact Centre, when they are offered a place before June 15<sup>th</sup> 2023, as it is too late to successfully complete all required steps in the registration process after this date.
- 7.5. In case situations occur in which this Regulation does *not* provide, the Committee will decide, on behalf of the dean, which actions and/or measures to take.

## 8. Final provisions

This regulation has been established by the Dean of the faculty of Electrical Engineering, Mathematics and Computer Science of the TU Delft, on 30 November 2022, and can be cited as Regulation Matching & Selection Criteria and Procedure for the bachelor program Computer Science and Engineering. This regulation applies to the Matching & Selection procedure executed in the year 2022/2023 for placement in the academic year 2023/2024 in the bachelor program Computer Science and Engineering.

Thus established by the Dean of the faculty EEMCS,  
Prof.dr.ir. L.J. van Vliet

Delft, 30 of November 2022

## E VHTO Scan results Computer Science and Engineering

Inclusivity Scan – Computer Science and Engineering 2022-2023



## Objectives & Methodology

### Main objectives

1. Establish a baseline measurement.
2. Create awareness among staff and students.
3. Provide tools for inclusive education.



## Objectives & Methodology

VHTO gathered **qualitative** and **quantitative** data:

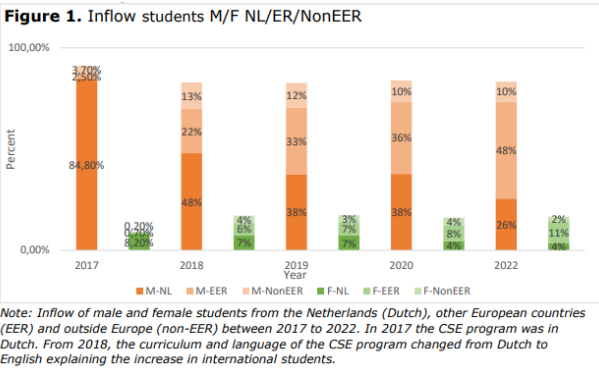
1. Data analysis student enrolment, dropout, BSA.
2. Survey among student population.
3. Focus groups with lecturers, support staff, students, study association and teaching assistants.

All results led to concise recommendations concerning the CSE **curriculum, selection and learning environment**.



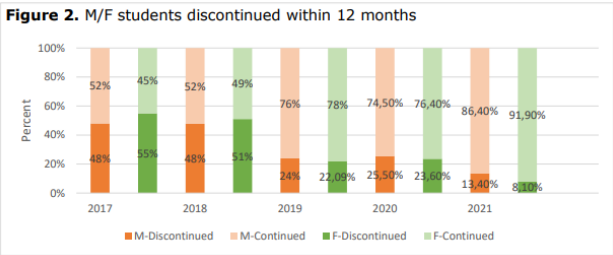
# Results

## Data Analysis



# Results

## Data Analysis





## Results

### Survey\* and Focus Groups

| Areas              | Results   |
|--------------------|---|
| Transition to CSE  | <ul style="list-style-type: none"><li>• Male students from EEA countries reported sufficient prior knowledge</li><li>• First generation students experienced more difficulties in transition to CSE</li></ul> |
| Sense of belonging | <ul style="list-style-type: none"><li>• Female students and male students from non-EEA countries reported lower sense of belonging</li><li>• No remarkable findings for other minority students</li></ul>     |
| Self efficacy      | <ul style="list-style-type: none"><li>• Female students reported lower self-efficacy than male students</li><li>• First generation students reported lower self-efficacy</li></ul>                            |
| Other              | <ul style="list-style-type: none"><li>• More than half of the students experienced inappropriate remarks or jokes</li></ul>   |

## Conclusion

- The importance of D&I is acknowledged by a number of students, lecturers and other staff members. First practices to contribute to D&I are in place.
  - Challenge 1: To spread the importance of D&I more broadly.
- The study culture within CSE is experienced as competitive and masculine. This is perpetuated by the implicit and sometimes explicit focus on and rewards for high achieving students and undervaluation of interpersonal skills and responsive engineering.
  - Challenge 2: To establish an inclusive study culture and climate within the highly diverse student population.

## Recommendations Study Culture

### To maintain

- D&I efforts of Study Association CH.
- Proactive outreach of academic counselors.
- Buddy programs for neurodivergent students.

### To improve: Sense of Belonging

- Use quarterly meetings to strengthen student connection and cheer on failure.
- Lower the threshold to visit academic counselors.
- Introduce buddy program for first generation students, female students and students with a migration background.



## Recommendations Teaching & Didactics

### To maintain

- Mentorate programme.
- OOP project.
- Academic skills learning line.

### To improve: Sense of Belonging and Self-efficacy

- Clear definition and execution of D&I goals.
- Embed mandatory group assignments in Y1S1.
- Introduce the Responsive Engineer learning line



## Detailed Recommendations Teaching & Didactics Curriculum Revision

### 1. Clear formulation of D&I goals in multiannual plan and its execution

- Force plans into actions and define clear targets focusing on catching sentiments in the student population concerning their perceived levels of satisfaction and belonging, offering trainings and meetings to employees and organizing facilities for inclusive purposes (e.g. gender neutral bathrooms, concentration rooms, prayer rooms).

**Examples:** Clear values and goals have already been defined in the Multi-Annual-Plan. The next step would be to clearly define definite targets based on the results and combine them with existing D&I goals.

### 2. Increase sense of belonging and elimination of transition issues

- Female students generally have lower **feelings of belonging** within the CSE community. **Group projects** are essential to improve such matters as it is recommended to implement them **early** on in the programme. Moreover, the survey has shown that Dutch (females more than males) students and first generation students generally feel less prepared in their ability to study CSE successfully, indicating a lack of prior knowledge and thus lowering their sense of belonging.

**Examples:** The CSE curriculum committee will consider embedding mandatory group assignments in Q1 and Q2 of Year 1 for the new curriculum.

## Detailed Recommendations Teaching & Didactics Curriculum Revision

### 3. Building self-efficacy

- Female students **experience lower self-efficacy** compared to male students. This can be solved by introducing more **role models** from underrepresented groups. It is recommended to **incorporate reoccurring and early feedback loops** (Q1) while ensuring that the course is designed in a way that it is **engaging for a diverse groups** of students. Self-efficacy is also increased by offering buddy programs and lowering the threshold to gain access to an academic counselor in any situation.

**Examples:** ESAEEMCS is currently working on concise tools and recommendations for lecturers to design their courses in a more engaging way for diverse audiences.

### 4. The Responsive Engineer

- The **Responsive Engineer** refers to knowledge and skills to utilize diversity and inclusion to improve future technologies and to grow as a computer scientist. Students should be able to 1) Understand the **fabrics of society** that CSE strives to serve 2) Understand the **impact of technology** on different groups in society 3) Develop skills with regard to **building human capital**. CSE has these skills currently embedded in the background of the programme, but VHTO recommends to raise these skills to the status of 'hard' CSE skills.

**Examples:** VHTO has given suggestions for embedding Responsive Engineering in the new curriculum. The CSE Curriculum Committee will consider further implementation.

## Implications Learning Lines & Courses

- Engaging course material for diverse groups
- Group-focused instruction
- Multiple (formative) assessment moments
- Underline interpersonal skills
- Role model representation





### Next steps:

Programme management is creating an action plan based on the recommendations of VHTO

Implement actions with curriculum revision in academic year 2024-2025