

External review of study courses and programmes at the University of Gothenburg

Panel statement for the **Master's Programme in Computer Science** at the IT faculty
(N2COS)

2023-05-25

Short background

The panel (see below) has been tasked with assessing the Master's Programme, in Computer Science, 120 credits (N2COS) at the IT Faculty based on the university's criteria in accordance with the policy for quality assurance and continuous quality improvement.

On January 17, a preparatory meeting was held where the panel met with representatives from the faculty, the host department of Computer Science and Engineering and the programme management. After the preparatory meeting, the faculty and the department submitted a number of input documents to the assessment panel (appendix 1). The panel held further meetings in preparation of the site visit. The site visit was carried out on March 2-3 (program for site visit, see appendix 2). The panel has then, based on documentation and site visit interviews, via online meetings jointly prepared their statement.

The panel has consisted of:

- Mikael Asplund, Senior lecturer, Docent, Linköping University
- Fredrik Engström, Senior lecturer, Docent, University of Gothenburg
- Lars-Henrik Eriksson, Senior lecturer, Excellent Teacher, Uppsala University (chair)
- Jörgen Gustafsson, Senior architect, Cloud Software Group

No student representative has been part of the panel.

Note: We will use “GU” as an abbreviation for the University of Gothenburg and “Chalmers” as an abbreviation for Chalmers University of Technology.

Summary

We find that the most important characteristic of the programme, if not its “unique selling point”, is how its wide course offering gives students flexibility in designing their own education. The programme should keep this flexibility.

Other important strengths of the programme are:

- The education is highly relevant for society
- Teachers are generally highly competent and active in research
- Close collaboration with Chalmers
- Administrative support and routines at the departmental level are good

Our most important recommendations concern improvement on strategic planning. This applies to many aspects of the programme such as course offerings, pedagogical development, teacher training and availability. Although collaboration with Chalmers is basically a strength, we note a number of practical issues relating to the courses and the host department being shared with Chalmers.

The education's main strengths and weaknesses as well as the assessment group's reflections and recommendations

1. Achieved study results match intended learning outcomes and the qualitative targets of the Higher Education Ordinance.

Strengths

Based on the courses given as part of the programme (i.e., the possible course choices available to students) as well as the courses actually taken by students that has graduated in recent years (as documented in the prepared material provided as input to the evaluation) the programme clearly provides students with the means and the tools to acquire both deep and broad knowledge, understanding, competence and skills in the field of computer science. The requirements regarding necessary prerequisites for courses and thesis work are clear and also enforced which ensures that students can identify what course choices are needed to achieve sufficient progression within the discipline.

The local learning outcomes specified in the programme syllabus are relevant and cover the general learning outcomes specified in the Higher Education Ordinance.

The programme emphasises the ability of students to choose the direction of their studies while still ensuring progression and depth. This aligns well with the learning outcome to “demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning”. The students are given the necessary information to make informed choices regarding course choices, progression, and what is required to meet the requirements to start their thesis project.

Weaknesses

While the students are given both the means and necessary information to choose courses that provide depth and progression within the field of computer science, there are no formal requirements in the programme syllabus that enforce this progression. Students are free to choose among a large set of courses and could potentially try to choose mostly “entry-level” courses. The fact that the examiner for the thesis project is responsible for ensuring that the student has sufficient knowledge from courses to start the project is good but not in itself a strong guarantee since it falls on individuals to make this judgement without clear guidance.

Due to the admission criteria to the program being relatively admissible, there are students that are not eligible to pursue some of the specialisation tracks within the programme. If the students lack courses in computer science they can usually sign up for a suitable course, but if they lack the basic mathematics, these courses are often only given in Swedish which makes it difficult to catch up.

There is no systematic process for mapping courses to learning goals at the faculty level which could potentially help in assessing the fulfilment of the Higher Education Ordinance. Work in this direction has been initiated by the department, an effort that should be continued and strengthened. The lack of such systematic mapping of learning goals increases the risk of some students not acquiring all the intended learning outcomes in the programme.

With respect to the learning outcomes related to “Judgement and approach” in the Higher Education Ordinance, there seem to be gaps in ensuring that students really achieve these goals. The mandatory courses that provide these are DIT199 The Computer Scientist in Society and DIT910 Master’s Thesis in Computer Science and Engineering (or the corresponding 60 hp course). The first of these mainly focuses on preparing the students for the thesis project (with some ethics-related content). The master thesis course matches these

learning outcomes in the course syllabus. However, based on sampling the theses provided as background material, there is considerable variation in whether the students really have to “demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used” as one of the general learning goals stated.

There are no systematic evaluations of retention/dropout rates for the students admitted to the programme. The graduation rates were provided as background information for the evaluation and with an overall rate of 44% over a twelve-year period.

Recommendations

- Ensure that the programme syllabus explicitly requires progression and depth for every student.
- Consider adjusting the admission criteria so that students that enter the program can benefit from most of the possible specialisations within the programme.
- Continue the effort to systematically map learning outcomes from courses to programme learning outcomes.
- Ensure that every student achieves the programme learning outcomes relating to judgement and approach.

2. Teaching is focused on student-centred learning.

Strengths

The courses in the programme implement a variety of teaching methods and examination forms including lectures, labs, seminars, assignments, project work and so on. Many of these teaching methods encourage student-centred learning which in some cases is explicitly highlighted in the course description documents. The students that were interviewed during the site visit described that teaching forms varied between courses and were generally positive with regards to the pedagogical forms used. The teachers describe that overall, there is an increase in alternative forms of teaching and examination and that there is a large degree of freedom for the examiners to develop courses in the direction they want to go.

Weaknesses

There are no coordinated strategic efforts to increase the focus on student-centred learning within the programme. Instead, such efforts are driven by engaged teachers, despite not really having the time to do extensive course development. Moreover, the initiatives typically seem to originate from the Chalmers side rather than from GU. We emphasise that this imbalance cannot be faulted on the programme supervisor who has limited means to impact individual courses within the programme.

According to both teachers and students, the traditional teaching methods still dominate in the programme. While modern teaching forms such as flipped classroom and continuous examination see increasing use, changes depend on individual teacher interest – there is no strategy and the programme supervisor has no influence over it.

There seem to be a number of factors that limit the tendency to try out alternative forms of teaching and examining. First, the teachers have limited time to engage in course development since they are pressed with a high workload as it is and there are obstacles to increasing the staff (see also section 4). The teachers describe a situation where it is not difficult to get financial support for course development, but difficult to find the time to do the work. Second, pedagogical development at large is not prioritised in relation to other activities. This can for example be seen in the lack of mechanisms to support pedagogical

excellence at the faculty. Finally, the administrative overhead in making changes to courses (i.e., two separate and lengthy processes for changing syllabi) discourages from making changes. (See also comments in section 8.)

Recommendations

- Increase efforts to encourage and reward pedagogical development and excellence.
- The programme should devise a strategy for the course development including modern pedagogical techniques.

3. The content and form of teaching rests on scientific bases and proven experience.

Strengths

Teachers generally have high subject competence and are involved in research. Many are highly experienced. As a policy, the host department only has teacher positions requiring a Ph.D. (Although for economic reasons there are a few junior lecturers (“adjunkter”) without a Ph.D.)

The evidence from course plans and documentation as well as the high competence of teachers ensures that the contents of courses rest on scientific grounds. This is also supported by interviews – students feel that courses are generally of high quality.

Weaknesses

The course offering appears to not fully exploit the possibility to connect with research done at the department. We understand that this is not due to lack of funds to finance course development but for lack of teacher time.

Recommendations

- Consider developing more courses that connect to research done at the host department.

4. Teachers have up-to-date and adequate competence as regards their subjects and teaching and learning in higher education, and the numbers of teachers are in proportion to the scope and content of study courses and programmes

Strengths

Teachers are in general highly competent in their subjects and involved in research relevant to the courses they are teaching. Students find teachers very experienced and many of them are very good pedagogically. Most teachers have the pedagogical training (10 weeks) required by GU. The number of teachers is sufficient for the course offering.

Weaknesses

Although the number of teachers is sufficient, there is little spare capacity. When it comes to recruitment of teachers, Chalmers only allows a certain number of teaching positions even though there are economic means to hire more teachers. GU is more flexible but on the other hand there is a lack of research resources on the GU side, which hampers recruitment. According to interviews, there is a tendency to recruit new teachers mainly based on research needs rather than teaching needs.

According to the supplied list of teachers/examiners on a sample of courses, a notable number of teachers do not have the required pedagogical training. This impression was

reinforced during the interviews. One reason which was mentioned at the visit is scepticism towards pedagogical training by some teachers. According to the deputy head of department with responsibility for education at the basic and advanced level, there is also a long waiting list for the teacher training course.

Once teachers have taken the compulsory pedagogical training, there is little further personal pedagogical development. There are some pedagogical seminars and collegiate discussions at the department, but this is mostly informal. There is no strategy for continued development of teachers' pedagogical skills beyond the required minimum. Likewise, there is no organised mentorship for younger teachers.

The teachers perceive a lack of time for personal pedagogical development while the director of studies states that there is time but not much used.

None of the teachers involved in the programme have been appointed excellent teacher (or, as far we understand, tried to be). There is no tradition in the department and no “carrot”.

Recommendations

- The number of teachers should be increased to provide a buffer and to make time available for pedagogical development.
- The department should devise a strategy for the pedagogical development of its teaching staff.

5. Study courses and programmes are relevant to the needs of the students and society. Description and analysis of the programme strengths and weaknesses in relation to the criterion, as well as any recommendations for suitable improvements.

Strengths

The programme is highly relevant for industry. The programme council includes an industry representative. Generally, the labour market in computing is very good. (But see the comment about alumni surveys below.)

There is an ample and strong collaboration with industry around master thesis projects and the department also collaborates with industry through guest lectures. The programme offers a large number of courses which covers a broad range of skills requested by industry.

The program is highly international. All courses are given in English and roughly half of the students on the programme are international. A high proportion of the teachers also have an international background.

Weaknesses

Beside the representation on the programme council, there is little strategic collaboration with industry as regards to course contents and the programme syllabus.

The programme makes no alumni surveys and makes little effort to follow up on the effectiveness of the programme on the career of the alumni.

There are very few women in the programme even in comparison with similar programmes in other universities. There are no substantial efforts focused on recruiting women to this programme. Instead, the department focuses on initiatives for recruiting more women to the bachelor programmes, e.g. the Girls Code Club and events at Vetenskapsfestivalen are excellent examples of such initiatives.

Recommendations

- Increase strategic collaboration with industry around the programme syllabus.
- Carry out alumni surveys.
- The department should continue and intensify the efforts to promote the interest for computing science among young women and girls.

6. Students have influence in planning, implementing and monitoring study courses and programmes.

Strengths

There is a good formal structure which gives the students the opportunity to influence the planning, implementation and monitoring of courses and the programme as a whole. Students have representation on all levels: the programme council, the faculty board and the University board.

As the programme is characterised by a large degree of freedom the students also have a large direct influence on the profile of their degree.

There is an elaborate system for course evaluations which include web based surveys, mid-course meetings and course evaluation meetings with student representatives. In general the teachers take the result of course evaluation into account when developing courses although the students witness that there are exceptions. The result of course evaluations are also brought up in dialogues between teachers and managers.

Weaknesses

Although the formal structure for student influence is good we see some problems.

Student influence over the programme as a whole is limited as there is no systematic evaluation at that level, e.g. there are no regular attempts to investigate students' experiences and views of the programme as a whole.

The students state that the information about the mechanisms for student influence needs to be improved. New students on the programme have a poor understanding of the purpose of the processes and their own role.

Almost all courses on the programme are shared with other programmes. For the course evaluation meetings the programmes at Chalmers appoint student representatives randomly, while for this programme, being a GU programme, students have to volunteer. Sometimes there are no student representatives from the programme. Although it is still voluntary for the randomly selected students to participate, a large proportion of the selected students do choose to participate. The participation of Chalmers students does also benefit the students on the GU programme but there is a risk for a bias and the perspective of students from GU may be lost. (See also under section 7.)

The students stated that there is a limited interaction between the students on the programme. The students volunteer for course evaluations, thus they primarily represent themselves so there is a risk that a few committed students get an unproportional influence even though their opinions may not reflect all students on the programme.

Since most courses are shared with other programmes the programme council has a weak formal influence on the course syllabus. In practice, the program supervisors have a fair amount of influence if they can agree with other programme supervisors on courses that are

relevant to several programmes. There is a risk that the student perspective is lost in this kind of informal process.

Recommendations

- The newly constituted programme council should take an active role in discussions around the course curriculum and the evaluation of the programme to strengthen the influence of the students on strategic decisions.
- The programme council should include more than one student representative to get a broader student perspective.
- The students should be informed about the processes for student influence at the start of the programme.
- The programme should adapt the same process for randomly selecting course representatives that Chalmers programmes use.
- There should be regular student surveys to get the students' overall view on the programme.

7. The study and learning environment is accessible and purpose-oriented for all students.

Strengths

In general, the lecture halls, computer labs, study rooms and social areas are well-equipped and otherwise suitable for both teachers and students. The availability of lecture halls and study places seemed acceptable at the moment.

The availability of support in the form of study counsellors, study administrators and programme supervisor seems to be good and there is an active strategy at the department to identify students that struggle with courses and offer them individual support. There is also ongoing work to identify reasons for why and when students drop out of the programme, this should be important knowledge for further development work with the aim to improve the student completion rate of the programme.

Weaknesses

During the interviews the teachers raised the need for more computer labs for teacher-led sessions. The present situation forces teachers to minimise the number of labs with the possible consequence that the teaching quality might be affected negatively. Also, the students raised the need for more student bookable group rooms. Today, the students need to book group rooms well in advance, making it hard to arrange meetings for group projects. There is also a more general worry, both among teachers and students, about the availability of lecture halls, study places and computer labs once campus Lindholmen is abandoned and all activities are moved to campus Johanneberg.

We noted that there are no teaching rooms suitable for alternatives to traditional lectures, labs and exercise sessions. There are for example no rooms at campus Johanneberg designed for active learning methods. Even though this was not identified as a problem by the students nor the teachers, we believe that the pedagogical developments would be helped by the availability of a larger breadth of different types of teaching and learning environments. A minor problem with missing power outlets for the students in the lecture halls was also noted.

There is a widespread feeling among the GU students of being “second-class students” in relation to the Chalmers students. This is partly due to the fact that the GU programme is much smaller than the similar Chalmers programme, but the students also mentioned several other examples of this (not getting reduced prices on coffee and food, non-access to

swimming pool, lecturers “forgetting” about the GU students, etc) that taken together lead to a non-welcoming atmosphere and, in the long run, to great frustration. The effect of this feeling of alienation might be mitigated by a strong cohesion of the student group, and even though there is a physical space only for GU students, “Monaden”, more could be done to strengthen the cohesion. A stronger and more active student group would also have positive effects on students’ health, this is especially important for incoming students without an already existing social network.

Recommendations

- Investigate the possibility to get access to more teacher-led computer labs and more student bookable group rooms.
- Ensure that the move of the campus at Lindholmen to Johanneberg doesn’t negatively affect the availability of lecture halls, labs and study places.
- With the aim of creating a stronger cohesion in the student group, in collaboration with student organisations, arrange events and activities for the GU students, for example in the form of student-led seminars that may be combined with social activities.
- Together with the student unions at GU and Chalmers discuss the situation for the GU students at campus Johanneberg with the intention to overcome some of the issues raised.
- Ensure that teachers and other staff members are aware of the situation for GU students.

8. The study courses and programmes are continuously monitored and developed.

Strengths

As mentioned in section 6, Chalmers has a quite elaborate and well-structured process for course evaluation that is also used for GU courses. This process includes course surveys (web-based questionnaires with standardised questions), course board meetings (with student representatives, teachers and programme supervisor or director of studies), and mid-course meetings with student representatives. This is (according to students) mostly a well functioning process.

The department organises the programme council meetings jointly with the council of the bachelor programme (NICOS). There is also a forum for exchange between supervisors of different programmes.

Weaknesses

We noted that in none of the course board meetings that we have minutes from, the programme supervisor or the director of study from GU was present, only persons representing the Chalmers programme. It’s important that the perspective of the GU programme is present in the course development work and it would therefore by natural to invite the programme supervisor to these meetings.

Apart from the programme council meetings, at the level of the programme and the department as a whole our impression from the interviews is that there is no, or very little, continuous development work. Also, in the one meeting we got minutes from, only 3 out of 10 participants were academic teachers and none were present in the role of teacher representative from the Master's Programme.

There are no structured forms of collegiate collaboration, workshops or seminars for discussing course development questions and issues. In fact, the teachers note that even

though the department has a lot of teaching commitments there is not enough time for course development work. In practice the course development is driven and managed by Chalmers and their needs are in focus.

The teachers also note that the administrative process to revise course syllabi is complicated and slow. Revisions must be submitted at the beginning of the academic year the year before they take effect. This discourages teachers from revising course syllabi and hampers pedagogical development. Teachers have a feeling of being “stuck” in a complex administrative process.

Recommendations:

- Create fora for discussing development of courses and programmes. One theme to discuss would be to share good examples of working with course evaluations.
- Include the programme supervisor and/or director of study in the course evaluation process to ensure that the view of the GU programme is present; and include teachers from the master’s programme in the programme council meetings.
- Ensure that the administrative process for revising course syllabi is effective and streamlined between GU and Chalmers to lower the hurdles for course development.

9. Other views from the panel

We have noted two overarching issues:

- There seem to be a general lack of strategy in all aspects relating to development of the programme – course offerings, teacher recruitment and pedagogical development. This does not mean that there is no progress in these areas but it does mean that progress depends on individual initiatives and with a common strategy it could be made much better.
- The Department of Computer Science and Engineering, which is the host of the programme, belongs jointly to GU and Chalmers. Because of department policy as well as practicalities, both courses and teachers are shared with Chalmers. Chalmers is the dominating partner which limits the influence of the programme supervisor over the programme. Also, in practice Chalmers finances the course development which again limits the influence of GU over its own programme.

Appendix 1

List of input documents for the panel

- Riktlinjer vid framtagande och fastställande av åtgärdsplan med anledning av extern bedömning av utbildningskvalitet
- Vägledning för utbildningsutvärdering på grundnivå och avancerad nivå med extern bedömning
- Verktyg för inventering och utveckling av utbildningskvalitet
- Mall för bedömarutlåtande
- Kriteriestöd för bedömargrupper vid utbildningsutvärdering av grundnivå och avancerad nivå
- Bedömargruppens intervjuer/platsbesök
- Exempel på underlag för utbildningsutvärdering med extern bedömare – utbildning på grund- och avancerad nivå
- Uppdrag att genomföra utbildningsutvärdering med extern bedömning för Computer Science Master's Programme, 120 credits (N2COS) vid IT-fakulteten
- Policy för kvalitetssäkring och kvalitetsutveckling av utbildning vid Göteborgs Universitet
- Protokoll IT-fakultetsstyrelsen, 2022-10-26, utdrag
- Template Panel Statement
- Presentation from start-up meeting
- Recording of start-up meeting
- Syllabus, Course PM, Course Evaluations and Examiner lists for the courses DIT071, DIT101, DIT192, DIT199, DIT246, DIT281, DIT370, DIT401, DIT431, DIT669, DIT848, DIT910
- Course choices and progression [prepared by the programme supervisor]
- Course graph [prepared by the programme supervisor]
- Comments from a student
- Graduation rates [list prepared by the programme supervisor]
- Information about courses [students' application for courses, spring and autumn semester 2022]
- Introduction to the Master's Programme in Computer Science [presentation for students]
- Local Qualification Descriptor
- Overview [of supplied material, prepared by the programme supervisor]
- Programme Council Meeting 2022-06-10 [minutes]
- Programme Description [prepared by the programme supervisor]
- Programme Syllabus
- Strengths and Weaknesses [prepared by the programme supervisor]

Appendix 2

Programme for the evaluation panel's site visit, on March 2-3, 2023

March 2

The meetings and interviews were held in room 6209 of the EDIT building, Rännvägen 6B.

13:00 – 13:30	The evaluation committee's internal startup meeting
13:30 – 13:45	Introductory meeting with representatives of the faculty
13:45 – 14:40	Interview with study administration and study counselling
14:40 – 15:05	Interview with the vice head of undergraduate education
15:05 – 15:20	Coffee break
15:20 – 15:50	Interview with the programme supervisor
15:50 – 17:00	Interview with teachers
17:00 – 18:00	The evaluation committee has the opportunity to summarise its impressions from the first day
18:00 -	Dinner

March 3

The meetings and interviews were held in room 6217 of the EDIT building, Rännvägen 6B.

9:00 – 10:00	Campus tour, starting at the Rännvägen 6B entrance of the EDIT building
10:00 – 10:15	Coffee break
10:15 – 10:45	Interview with a director of studies
10:45 – 12:00	Interview with students and alumni
12:00 – 13:30	Lunch, and the evaluation committee has the opportunity to summarise its impressions from the second day
13:30 – 14:00	Meeting with representatives of the faculty and the programme for a presentation of first impressions