

# Åtgärdsplan N1COS

(Action plan)

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## **Introduction**

The evaluation report has been divided into eight sections, corresponding to the assessment criteria set out in the ‘Policy for quality assurance and quality development of education’ document. In each section the evaluation committee gives a short summary of their findings and, in most sections, lists a number of recommendations. In this document (action plan) we follow the same structure and for every assessment criterium we explain how we address the given recommendations.

# 1 Goal fulfillment

1. Include the national examination goals in the program design matrix, and connect them with courses in the program.
2. Include elective courses in the program design matrix, and connect them with (both national and program-specific) examination goals.

These first two recommendations are relatively easy to implement. We are going to extend the program matrix with the national goals as well as the elective courses. It may be good to have separate matrices, one for the mandatory courses (which is to a large extent already implemented), and another one for the elective courses. Ideally the mandatory courses should cover all (or nearly all) of the national and program-specific goals.

<i>Priority:</i>	low
<i>Cost:</i>	8 hours
<i>Action:</i>	Update program matrix in the program description document.
<i>Goal:</i>	The national (over-arching) goals and elective courses are part of the program design matrix.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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3. Include a basic understanding of computer architecture in the program-specific examination goals.

A recent change we made in our program plan is to make the course ‘Grundläggande dator teknik’ mandatory, partly because the course fits the program well, and partly because it enables more ‘samläsning’ between different programmes.

The recommendation by the evaluation committee is related to this change. However, the program plan already covers this program-specific goal in a general way, namely:

... *förståelse för ämnets teoretiska grunder* ...

which suffices. We don’t have program-specific goals for every mandatory course, on the contrary, the program-specific goals are described on a higher level and the mandatory courses are an implementation of these.

No action required for this recommendation.

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4. Make the more over-arching learning goals such as ethics, collaboration and presentation skills, evaluation of (new) technologies, explicit, and relate them to the various courses in the program.

This recommendation is closely related to recommendation 1 and 2 and is going to be addressed in the same way, namely by updating the program description document, see the defined action for recommendation 2.

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5. Ensure that every examination goal is covered by at least one mandatory course. Revise course syllabuses (or impose restrictions on combinations of elective courses) as needed.

The program matrix is quite new and during the development it was unclear if the following program-specific goal:

*visa förmåga att ta del av och bedöma nya tekniker och teknologier*

is explicitly addressed in one or more of the mandatory courses. Many courses most likely introduce new technologies and techniques, but we need to validate if this is explicitly listed in the course plans. We then need to decide how to address the possible discrepancy between the program plan and the course plans of the mandatory courses.

<i>Priority:</i>	medium
<i>Cost:</i>	4 hours (but may be more if we need to change course plan(s))
<i>Action:</i>	Check the course plans for the mandatory courses.
<i>Goal:</i>	The program-specific goal is covered by a (or many) course plan for a mandatory course.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31 (the possible changes to course plans will take longer)

6. Connect the mathematical courses more strongly with the rest of the program, for instance by discussing suitable examples/applications from computer science in these courses.

The evaluation report mentions that learning mathematics is a goal in itself, which we fully agree with. Connecting the mathematics courses with other courses is desirable. We already do this in some of our courses. For example, the course on ‘Functional Programming’ is closely connected to the course on ‘Discrete Mathematics’, which our students read in parallel. The lecturers of these courses refer to each others course regularly. In addition, we have a mandatory course ‘Mathematical modelling and problem solving’ in which students solve real world problems using mathematics from the ‘Linear Algebra’ and ‘Calculus’ courses.

Although we already address this issue, we can always improve. It is probably a good discussion topic for our teacher forum, how to highlight the connection with the (underlying) mathematics. See the action for recommendation 23.

<i>Priority:</i>	low
<i>Cost:</i>	2 hours
<i>Action:</i>	Make the recommendation a discussion topic in a teacher forum meeting.
<i>Goal:</i>	No specific goal, we already connect math courses to other courses.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

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7. On the course DIT561 Kandidatuppsats inom Datavetenskap, provide a brief written justification of the individual course grade to each student.

We fully agree with the evaluation committee that this needs to be addressed. The bachelor project is one of the most important courses of a student’s (bachelor) education and the grade should be accompanied by an explanation how the grade came to be. The bachelor project course has two formal examiners/coordinators, but every project is assigned an individual examiner. The grade is determined in a meeting with the coordinator (who makes sure the grade is calibrated with regard to other projects), the examiner, and the supervisor. During the meeting an extensive spreadsheet is used to calculate the grade based on input from the examiner and the supervisor. This information needs to be translated into a comprehensible feedback message that

should be given to the students.

We will meet with the two coordinators discuss how we can implement this.

<i>Priority:</i>	high
<i>Cost:</i>	2 hours
<i>Action:</i>	Plan a meeting with BSc project coordinators.
<i>Goal:</i>	The grading process is adjusted such that every individual student receives feedback on their grade.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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8. Reduce the group size for thesis projects on the course DIT561 Kandidatuppsats inom Datavetenskap to (usually) three students. Increase teaching resources for the course accordingly.

Although we really understand the evaluation committee and agree that a group size of three is to be preferred. However, given the fact that we every year struggle to get enough examiners and supervisors for the projects, it is probably infeasible to implement this recommendation within the time span of this action plan.

In addition, we put a lot of effort in preventing ‘freeloading’ and having the bachelor thesis as a project course has also advantages. For example, a group of students can take on a larger piece of work and make a more substantial contribution.

This recommendation should be passed on to higher-level management.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours (but possibly many more if we reduce the group size)
<i>Action:</i>	Meet with the vice-head of department for undergraduate education and director of studies.
<i>Goal:</i>	A possible group size reduction for bachelor thesis projects.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

## 2 Student-centered learning

9. Discuss questions and practical issues related to the program also in the meetings with the students in the program in years 2 and 3.

The program team consisting of the study counsellor, a student office representative, and the program manager, meet several times per year with the first year students (to discuss elective courses and talk about study techniques), and meet once a year with second and third year students (to discuss the bachelor project course). We already have implemented this recommendation.

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10. Think about how to give further feedback on student progress within a course, without further adding to the workload of teachers.

We are in favour of giving more (and timely) feedback to students. This suggestion could be implemented by using (a kind of) peer-reviewing between students. There are already courses using this option (for example, in the elective Object-oriented programming project course).

The ‘Introduction to Functional Programming’ course is going to use peer-reviewing in the HT23 course instance. There will be a test exam where students can experience what it is like to do a written-hall exam. After the test exam the students will grade another student’s exam and provide feedback.

This recommendation should be discussed with in our teaching forum, such that we can learn from each other. This recommendation will be a good discussion topic. See the action for recommendation 23.

<i>Priority:</i>	medium
<i>Cost:</i>	24 hours
<i>Action:</i>	Implement a pilot in the Intro FP course, and discuss in teacher forum.
<i>Goal:</i>	Run a pilot and evaluate it.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

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11. Teach research methods before students start on their thesis project.

It is probably a good idea to teach about research methods already in the bachelor. That being said, it is not required that a bachelor project is a *research* project. So, strictly speaking we don't need to teach this.

We have a mandatory course called 'Communicating Computer Science', which teaches students, among other topics, how to present a research topic, and how to read a research article. This course may be a good place to introduce our students to research methods. We will discuss this with the examiner for the course.

<i>Priority:</i>	low
<i>Cost:</i>	2 hours
<i>Action:</i>	Meet with the examiner for the Communicating Computer Science course.
<i>Goal:</i>	A possible change in the course plan for the above course.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

### **3 Education's scientific and experience base**

There were no specific recommendations for this assessment criterium.



## 4 Teacher competence and capacity

12. Think about how to reward groups of teachers in addition to individual teachers for good results in teaching.

This is an interesting recommendation by the evaluation committee, to stimulate the creation and work of teacher groups. We suggest to discuss the possibilities for such a reward in our program management meeting.

<i>Priority:</i>	low
<i>Cost:</i>	2 hours
<i>Action:</i>	Discuss the recommendation in the program management group.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

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13. Check that TAs have the required background when assigning them to a course.

We understand this observation by the evaluation committee. However, we do already check the background of our teaching assistants (TAs), of course. Every teacher is assigned a number of TAs depending on the number of students and the nature of the course. The teacher gets a list with students that applied for a TA position in the course, along with background information (such as which courses the student has taken, and if (s)he has been a TA before).

The problem is not so much that the background is not checked, but rather the amount of students that apply for a TA position. With a limited number of applications it is hard to get TAs with the appropriate background. It would be good to think about how to attract more students to our TA positions. Our program management meeting (led by the vice-head of department for undergraduate education), where all program managers together with Student Office representatives meet, is probably a good forum to discuss this.

<i>Priority:</i>	high
<i>Cost:</i>	4 hours
<i>Action:</i>	Put this topic on the agenda in a program management meeting.
<i>Goal:</i>	Increase the number of applications to our TA positions.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

## 5 Relevance for students and society

14. Investigate the possibility to allow a wider selection of elective courses.

It may be that some students have mentioned that the possibility to take courses from other universities is hard, but we don't recognize this problem. Students are free to read a course somewhere else and are offered the possibility to 'tillgodoräkna' a course if it has (nearly) the same course plan as a mandatory course. In addition, students can use courses taken elsewhere into account when applying for an exam<sup>1</sup>. We don't actively promote studying courses at other universities, but this is not our task. We do promote, however, and inform our students about the possibility to study abroad.

So we are not going to have any actions for this recommendation.

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15. Teach collaboration skills to prepare students for group work in the thesis project and later in their professional life.

Learning how to work together is really important, and should be part of the program. It is therefore that our students work together in a group in most of our courses. Many courses offer lab assignments, which are almost exclusively carried out in a group.

In addition, we have a number of elective courses (frequently chosen by our students) that are taught as project courses, which have collaboration skills as a learning goal. The fact that we don't have a mandatory project course, other than the bachelor project, is something that arguably would improve our program. The downside of such a change is that the elective part of the program will shrink, and it is this elective part that is valued much by our students.

The concrete action for this recommendation is to investigate whether or not to make a project course mandatory. A good forum for discussing this is the program council meeting. The program council meets every half year.

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<sup>1</sup>The restrictions stated in the 'lokal examensbeskrivning' also hold for these courses.

<i>Priority:</i>	low
<i>Cost:</i>	2 hours (plus 6 hours if we decide to change the program plan)
<i>Action:</i>	Investigate the options for making a project course mandatory.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01 (a possible change to the program plan will take longer)

## **6 Student influence**

There were no specific recommendations for this assessment criterium.

## 7 Accessibility and effectiveness of learning environment

16. Estimate the size and type of teaching facilities that will be required (at Campus Johanneberg) in the future, taking into account changing student numbers and pedagogical approaches. Create a plan to meet these needs both in the short and in the long term.

A relevant and important recommendation, though not something that can be solved locally by the program (manager). This recommendation should be passed on to higher-level management.

<i>Priority:</i>	high
<i>Cost:</i>	2 hours (increasing or adapting the facilities will cost a lot more)
<i>Action:</i>	Discuss with vice-head of department for undergraduate education.
<i>Goal:</i>	–
<i>Responsibility:</i>	higher-level management
<i>Deadline:</i>	?

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17. Install a whiteboard and (where possible) a projector in all computer lab rooms.

Upgrading our computer lab rooms with a projector would be an improvement. We do have such lab rooms, but they have a limited capacity and are used quite a lot (which means that they are not always available). Having a projector available in all lab rooms will open up different forms of pedagogical approaches. However, implementing this may be challenging, because many courses have lab assignments in other buildings than our ‘own’ (EDIT); we need to investigate whether this upgrade is feasible.

There are just a few computer lab rooms without whiteboard. Fixing this should not be hard and not too costly.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours (plus more hours for the installation of projectors, in addition to the acquisition cost)
<i>Action:</i>	Meet with vice-head of department for undergraduate education to discuss the possibilities and next steps.
<i>Goal:</i>	All computer lab rooms in the EDIT building have a whiteboard. Try to increase the number of computer lab rooms with a projector.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

18. Decide how the legal requirements for accessibility of digital content should be implemented. Provide staff training for teachers and others who create digital content.

A relevant recommendation, which does not only concern courses in our program, but is relevant for courses in other programs as well. Again, the program management meeting, where all program managers together with Student Office representatives meet, is probably a good forum to discuss this.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours (plus hours for the possible training)
<i>Action:</i>	Put this topic on the agenda in a program management meeting.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

19. Revise course syllabuses to include a formulation that permits individually adapted examinations for students with a documented disability.

As the evaluation committee mentions, it is allowed for examiners to adapt examination for students with a documented disability (with a so-called ‘NAIS-intyg’), and we inform students about this. Both Göteborgs Universitet and Chalmers have clear instructions to students how to apply for

this, see:

<https://medarbetarportalen.gu.se/studieadministration/sah-grund-avancerad-niva/administrera-pagaende-studier/pedagogiskt-stod/former-av-stod/anpassad-examinati>

Instead of revising all course syllabuses, it is probably preferable to have the information centralized. If we would need to change something in the description, it will take much less effort. The information is now easy to reach for all of our students.

So, we suggest no action for this recommendation.

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20. Implement an “early warning” routine to identify and offer study advice to students that are falling behind.

I applaud this recommendation and think it could be beneficial for the ‘genomströmning’ rate. We should create a process where we check the progress of our students and offer help if they fall behind. For example, after the first and second term. For ethical reasons we are not allowed to contact students directly, but we can inform all students that it is possible to get help if one is falling behind.

<i>Priority:</i>	high
<i>Cost:</i>	8 hours (plus 4 hours every term)
<i>Action:</i>	Create a process, together with our study counsellor, to reach out to our students that fall behind.
<i>Goal:</i>	Have a process installed to follow up students.
<i>Responsibility:</i>	program manager and study counsellor
<i>Deadline:</i>	2024-06-01



## 8 Continuous evaluation and development of the education program

21. Look more closely at when students finish, or where students go during their studies. Perhaps discuss with other study advisors about how to keep track of students.

The evaluation committee pointed out that the ‘genomströmning’ numbers are low, which seems to be the case according to the statistics that are gathered by a previous study counsellor. Although we need to validate these numbers, we have no reason to believe that they are incorrect.

To improve the ‘genomströmning’ we need to understand why these numbers are so low. The numbers show that quite many students make it to the last term (that is, the second term in the third year), but they do not take out an exam.

The first step is to gather more information (from the ‘datalagret’) and try to see if we can find the reason for the low throughput. We have booked a meeting with Magnus McHale-Gunnarsson, an expert on retrieving statistics from the ‘datalagret’, in September 2023.

<i>Priority:</i>	high
<i>Cost:</i>	40 hours
<i>Action:</i>	Look closer at the statistics and derive possible causes from them.
<i>Goal:</i>	A small report on the possible causes for the low throughput.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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22. Evaluate all courses (including DIT561) through course evaluations.

We will contact the examiners/coordinators for the bachelor project course and ask for how the course has been evaluated recent years. If this has not been done in a similar manner compared to other course, we should fix this.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours
<i>Action:</i>	Meet with the BSc project examiners.
<i>Goal:</i>	The bachelor project course is evaluated in the same way as other courses.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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23. Institute a regular forum for all teachers on the program to meet and discuss course and program development, and to share best practices (perhaps together with the other teachers in the department).

A good recommendation by the evaluation committee, which we already acted upon. Together with the program managers for Datateknik and Informationsteknik at Chalmers, we have started a seminar series for our teachers in which we discuss relevant topics. We had our first meeting on the 13:th of June 2023, and discussed the growing number of students and the implications for lab assignments and scheduling. The meeting was successful and we plan to have the next meeting soon, which will be about how to deal with generative AI, such as ChatGPT.

A number of recommendations are excellent discussion topics for these meetings, as mentioned before.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours
<i>Action:</i>	Plan next teacher forum meeting.
<i>Goal:</i>	Continue with the teacher forum meetings.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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24. Review the course evaluation template to find a good balance between level of detail and number of questions. Focus on relevant questions that will provide actionable feedback.

Until last year we used the course evaluation template from Chalmers for evaluating our courses. This course evaluation was sent out the student after the exam. These evaluations used to have a low level of participation. Further, we noticed that if the exam was perceived as tough, nearly all questions

would get a lower mark and the remarks often mention the exam regardless of the question (for example, a question about course literature would still get remarks about the exam).

We wanted to try a different approach to separate the course evaluation from the exam and try to increase the participation. We reused a course evaluation template from the N1SOF program and sent out this prior to the exam in the final study week ('läsvecka') of the course. We decided to use this form of evaluation for a year and then evaluate it. The participation did increase for most courses, but the size of the evaluation template is perceived as too long. We are going to revise the evaluation template and reduce the number of questions.

Note that courses that are shared between Chalmers and GU still use the Chalmers template.

<i>Priority:</i>	medium
<i>Cost:</i>	6 hours
<i>Action:</i>	Revise the course evaluation template.
<i>Goal:</i>	An improved and shorter course evaluation template.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

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25. Systematically (e.g., in the course guide and/or in the introduction lecture of each course) inform students about changes that were made to a course since the last course evaluation.

We could instruct our teachers to mention the changes from the previous course instance during the first lecture. However, this will not inform the students that have already taken the course and who's feedback led to the possible changes. It is good to let these students know that we really listen and act upon feedback. We should announce these changes somewhere more centrally, perhaps on our program Canvas room (which is under construction).

<i>Priority:</i>	medium
<i>Cost:</i>	4 hours
<i>Action:</i>	Discuss with Student Office the best way of informing students.
<i>Goal:</i>	The course changes are announced at a central place.
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

## 9 Other issues

26. Involve female teachers (lecturers, guest lecturers, TAs) in the program.

A valid point by the evaluation committee, but this cannot solely be solved by the program (manager). This recommendation has to be taken care of by higher-level management, which is already actively pursuing this.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours
<i>Action:</i>	Meet with vice-head of department for undergraduate education.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2023-12-31

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27. Create a visual representation of the dependencies between (both mandatory and elective) courses on the program, to aid students in their course selection.

We already give an overview of the mandatory and elective courses, and some possible collections of courses for a particular topic (so-called ‘tracks’). This overview is partly graphical and is not very clear on the dependencies. The students are currently advised to look at the course plans and investigate the course prerequisites. We could aid our students, as the recommendation suggests, by creating a visual overview. Our program Canvas room would be a good location to store this visual overview.

<i>Priority:</i>	medium
<i>Cost:</i>	16 hours
<i>Action:</i>	Create a visual overview of the mandatory and elective courses.
<i>Goal:</i>	A visual overview is centrally available for our program students.
<i>Responsibility:</i>	program manager and study counsellor
<i>Deadline:</i>	2023-12-31

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28. Formulate course entry requirements in a way that agrees with actual admission practice, and ensure their consistent application to all students.

At the Gothenburg University the entry requirements are strict, students need to fulfil them otherwise it is not possible to register for a course. The Computer Science program makes an exception for the courses in the first year, to let beginning students to continue with their studies even when they have failed a particular course. This is different from Chalmers, where course prerequisites are regarded as recommendations and are not enforced. Many of the courses in the program are read together with Chalmers students.

One can debate which approach is better, in some cases it may be better to be more flexible, as we do in the first year, in other cases it is very desirable to have strict prerequisites, such as in project course where a lack of prerequisites may affect other students.

The recommendation offered by the evaluation committee is interesting and needs to be investigate whether it can be implemented. Another complicating factor is that many courses can also be read as single-subject courses.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours (unknown number of hours to implement)
<i>Action:</i>	Discuss with the vice-head of department for undergraduate education and the ‘utbildningssamordnare’ whether it is possible to reformulate the entry requirements.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01

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29. Review and if possible shorten the process for syllabus changes, particularly for courses given in the autumn. Consider introducing multiple deadlines per year.

The process for making a change in the course plan is indeed slow and it would probably more convenient for teachers if changes can be made effective in a shorter period of time. On the other hand, a course plan should be quite stable.

A consequence of having multiple deadlines per year is that this will probably introduce extra work for our administration, which already has a high work load.

Note that the evaluation report mentions that ‘*it is not always possible to*

*effect a change...?*, which is not at all possible.

<i>Priority:</i>	medium
<i>Cost:</i>	2 hours (hard to say how many hours to make the actual change)
<i>Action:</i>	Discuss with the vice-head of department for undergraduate education and representatives from the administration.
<i>Goal:</i>	–
<i>Responsibility:</i>	program manager
<i>Deadline:</i>	2024-06-01