

Course Analysis

IS1500

Computer Organization and Components (Datorteknik och Komponenter)

Quantitative Data

- **Course code:** IS1500
- **Year:** Fall 2016 (Periods 1 and 2)
- **Credits:** 9 hp
- **Main programs:** CINTE, TIDAB, TIEDB, TCOMK
- **Examiner:** David Broman
- **Course responsible:** David Broman
- **Responsible for lectures:** David Broman
- **Number of students:** 261 in Daisy (deltagare).
- **Number of participants at the exam:** 181 (may include retake students)
- **Students that passed the first exam:** 141 (78%)
- **Students that have finished all parts of the course:** see LADOK.

Course Summary

The course teaches the fundamentals of computer organization, including both software and hardware. The course is divided into 6 modules:

1. C and Assembly Programming
2. I/O Systems
3. Logic Design
4. Processor Design
5. Memory Hierarchy
6. Parallel Processors and Programs

The course is divided into 3 LADOK parts:

1. Labs in logic design (1.5 hp)
2. Labs and home labs (4.5 hp)
3. Written Exam (3hp)

There are in total 14 lectures, 6 exercise sessions, 4 seminars, 6 laboratory exercises, and one mini project. The course ends with a 5 hour written exam.

Course Evaluation Methods

The course was evaluated in three ways:

- We performed a Muddy Cards evaluation in the middle of the course, where the students could on a voluntary basis answer anonymously on a sheet of paper what they thought was good with the course and what they thought should improved. The teacher then collected the information and gave feedback on the response at one of the following lectures.
- We formed a course evaluation group (kursnämnd) that consists of students and the examiner. One meeting was held in the middle of the course and another after the course.
- Course questionnaire using the KTH Social system. The course evaluation was performed after the course. The system sent out the questionnaire to 215 students. The answering frequency was 24%.

Changes from Previous Years

In the fall 2014, this course got a new examiner: David Broman. The last time the course was given was in the fall 2015. The major changes of the course this year, compared to before fall 2014 are the following:

- Completely new lectures (introduced in 2014)
- The course got completely new labs. Students in groups of two can borrow ChipKIT embedded boards and bring them home during the course (introduced in 2015)
- A new mini project where one or two students create a small project in C. Students chose the project topic on their own (introduced in 2015)
- New concept of seminars where students can get bonus points to the exam. The purpose of the seminars is to train the student on the more theoretical aspects of the course and prepare them for the written exam. The seminars are optional (introduced in 2015).

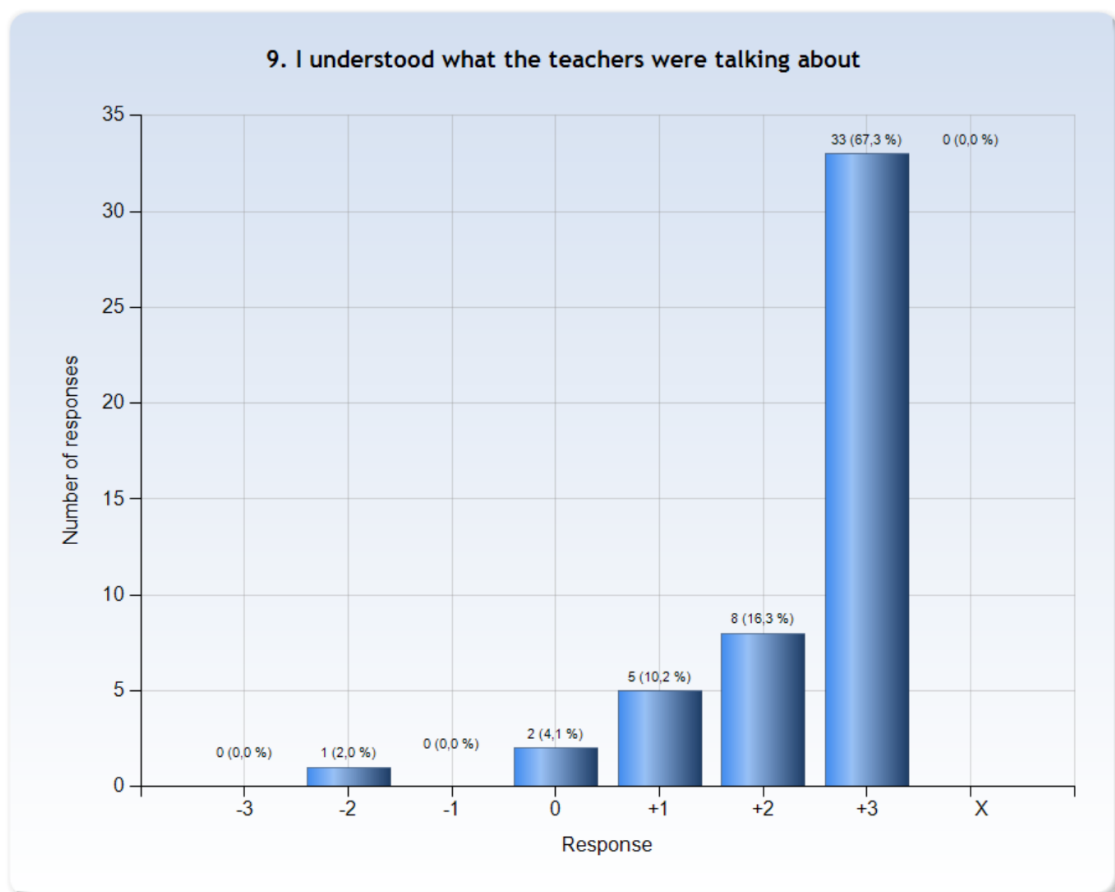
Since the last time the course was given (fall 2015), only few updates have been made. One of the changes was to introduce the separation of basic and advanced projects. This means that students need to be good in both the practical parts (the project) and in the theory part (written exam) to be able to get the highest possible grades (A or B).

Feedback from Students

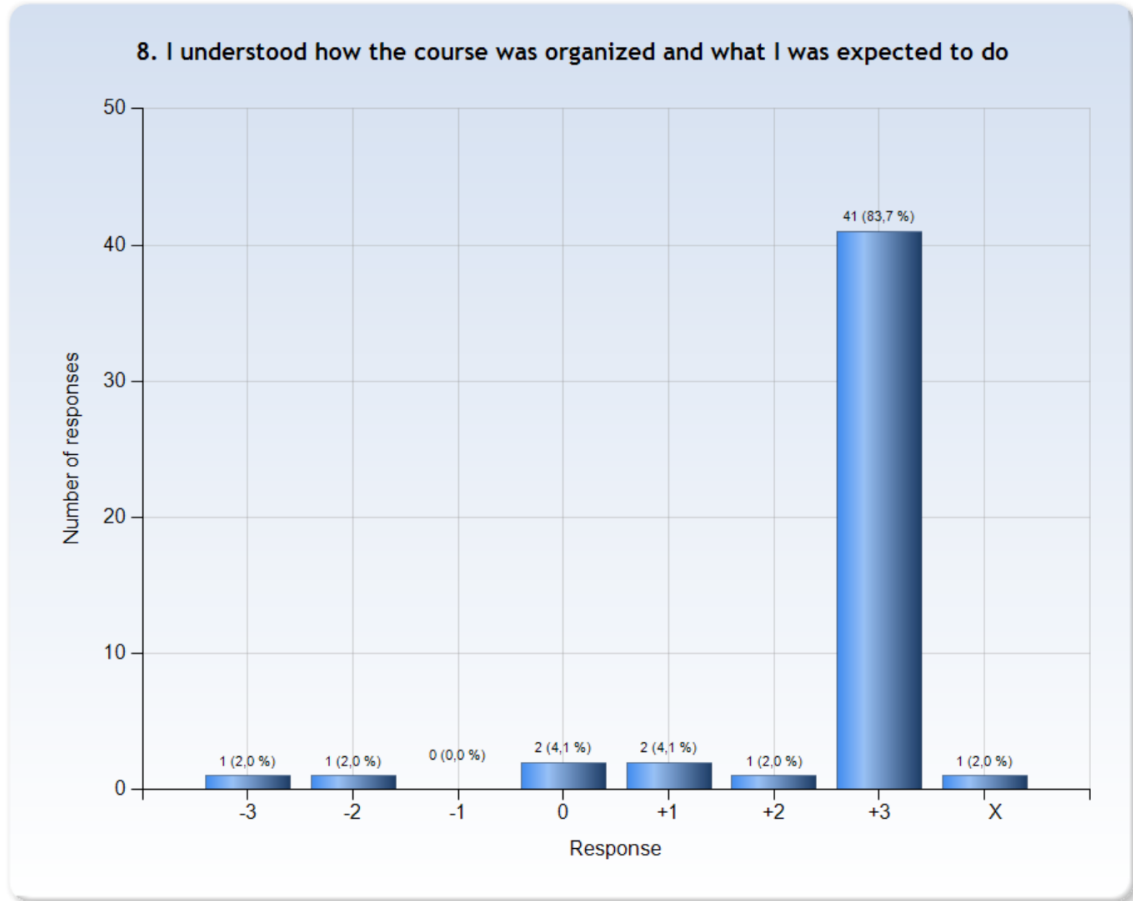
The following section summarizes the most essential feedback that was received from the Muddy cards, the course evaluation group (kursnämnd), and via the course questionnaire form. The figures are taken from the web-based course evaluation.

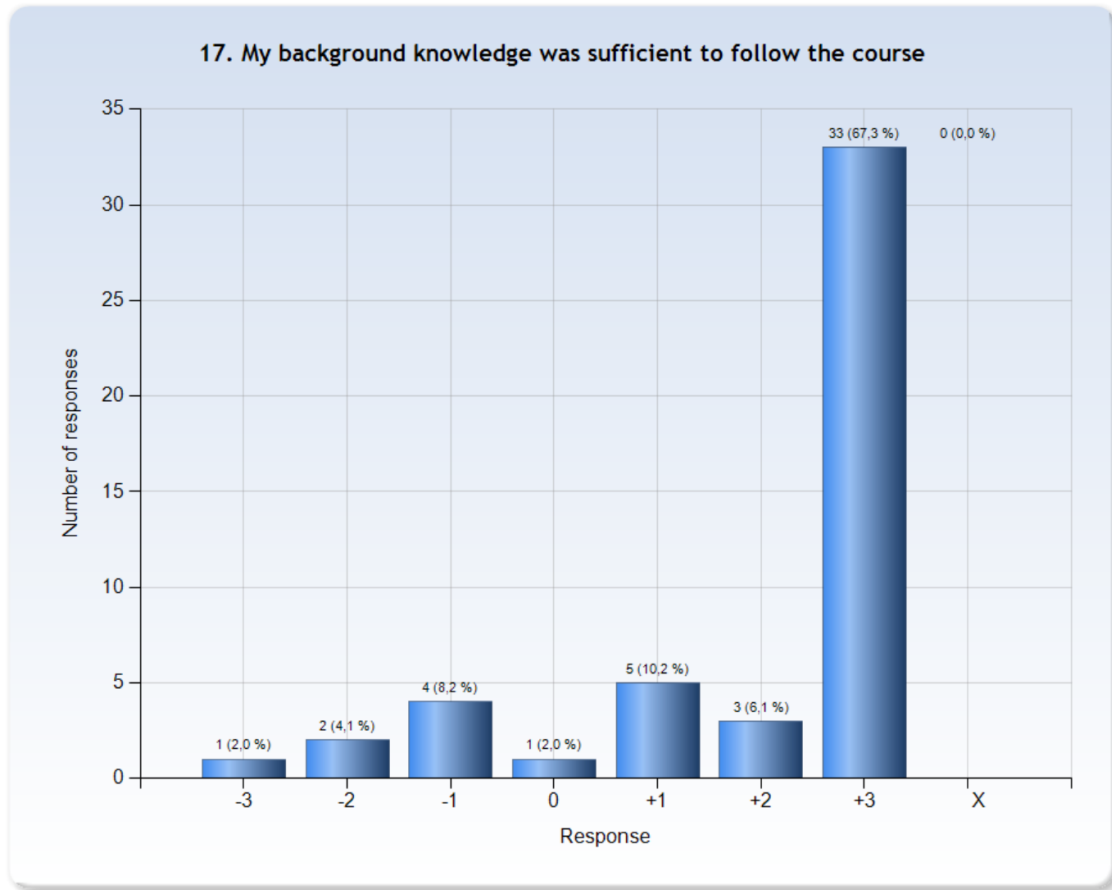
Lectures and Organization

The majority of the students stated that they liked the course very much. In particular, many students were satisfied with the course organization, the lectures, and the course organization. Considering the following figure 9 (from the LEQ student evaluation), it shows that most students, with a few exceptions, understood the main concepts thought by the teachers.



According to Figure 8, it is clear that the significant portion of the students agreed that the organization of the course was clear (83.7% answer +3). We believe that we have reached a fairly stable course now with a good organization. Note also that Figure 8 has improved compared to previous year.

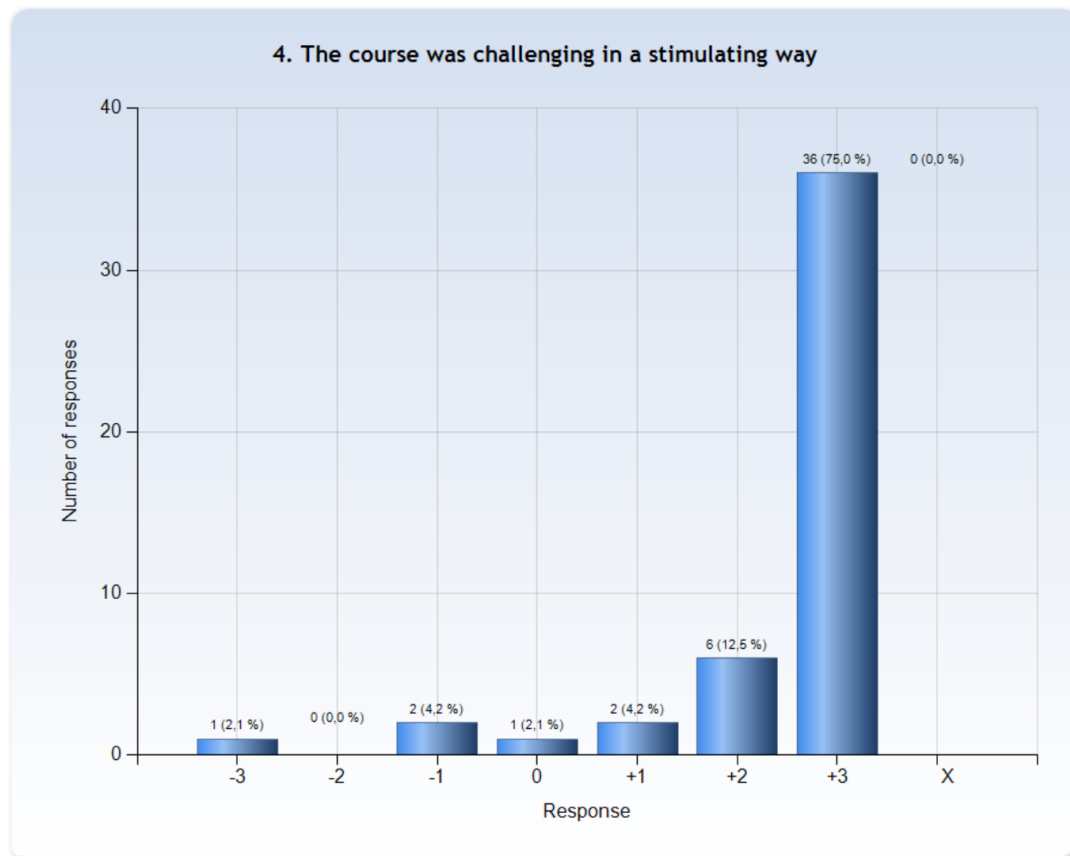




Previous years, some students have stated that they did not have enough background for the course. This seems to have improved compared to previous years (see figure 17). In this year, I also added an extra question and answer lecture session in the beginning of the course.

The main critique this year was about the system that was used for reporting (Daisy). However, most students also understand that this will be changed the coming years.

Despite the fact that many students found that the course requires a lot of work, most students found that the course was challenging in a stimulating way. See Figure 4 where 76% of the students answer +3.



Some students commented that module 6 was not as clear as the other modules, because it was more theoretical. We do understand these comments and will try to give a clearer overview of this module. However, unfortunately, it will not be possible to add any more labs for this module, because the course will then be too large.

In summary, the majority of the students seem to be very happy with the organization and the lectures, and few changes are planned for next year.

Exercises and Seminars

Several students expressed explicitly that the seminars were good. At the course meeting, some student representatives expressed that they wanted even more seminars. This is very positive, and we can see a clear trend that more and more students are actually doing the optional seminars. We can also see this in the results of the exam. This year 78% of the students passed the exam during the first exam occasion, which is a clear improvement since last year where 68% passed. In general, the students were also very positive concerning all assistants, with a few comments and exceptions.

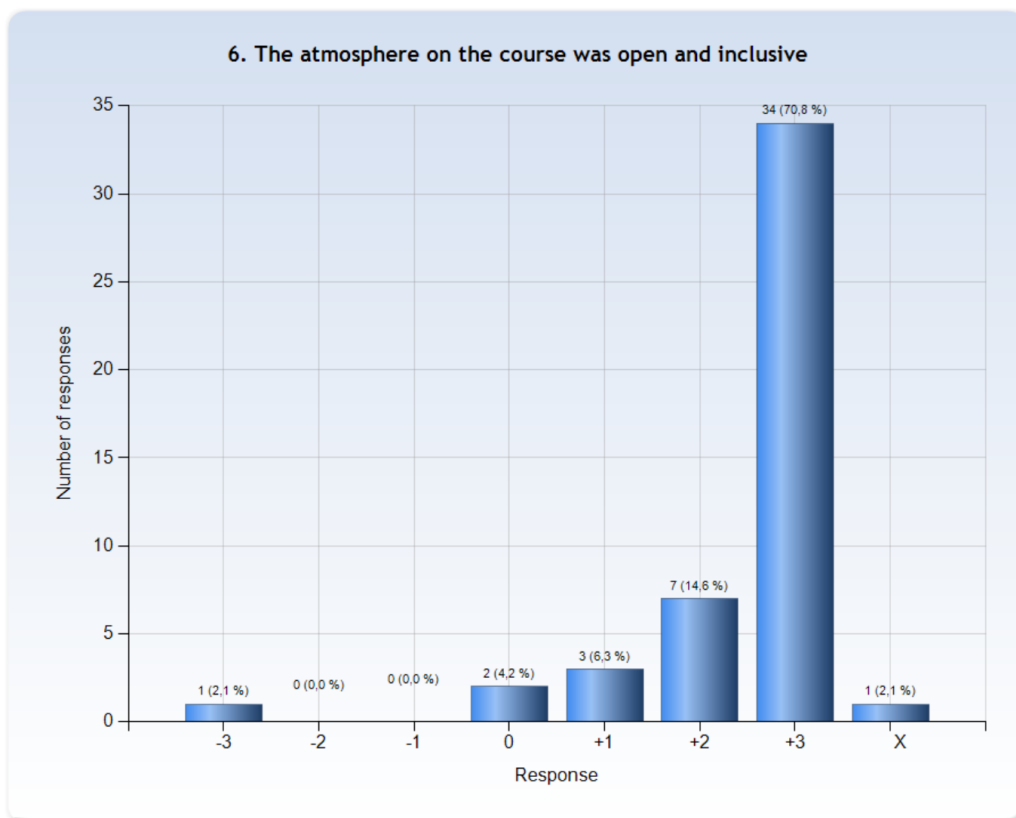
Labs

Some comments wondered why we remove the cache lab this year. The main reasons are: i) resources (we cannot have too many labs), ii) we have introduced the mini-projects which means that the course will be too large otherwise. We can see that quite a lot of the FX students failed on the cache part. Hence, we are planning to add some exercises/optional labs for the cache, to improve this. However, we should also note that the pass rate for this year's exam was significantly better in general.

A few students commented that some TAs examined the labs in different ways. We are continuously improving this and we can also note that the problem is less significant this year.

Another improvement we did this year was to half the lab time, from 4h to 2h. This shortened the waiting time for TAs significantly. The waiting time was one of the major complains previous years. This year, there were basically no comments about waiting time.

In general, a large majority of the students found that the course was inclusive and had a good atmosphere (see Figure 6)

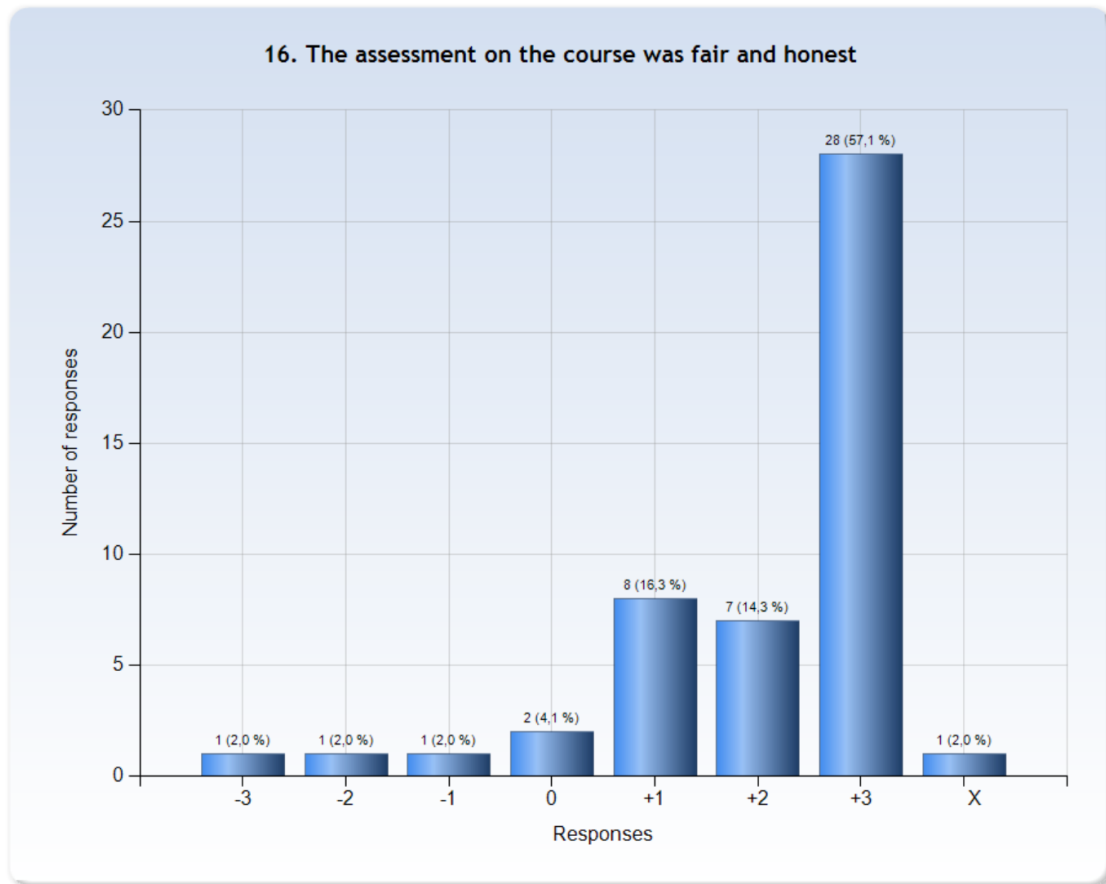


Mini Project

Most of the students were positive about the project, especially after that they have finished the project. In general, there were few other comments about the project.

Examination

In general, most students were satisfied with the assessment and the examination (see Figure 16 where 57% answered +3)



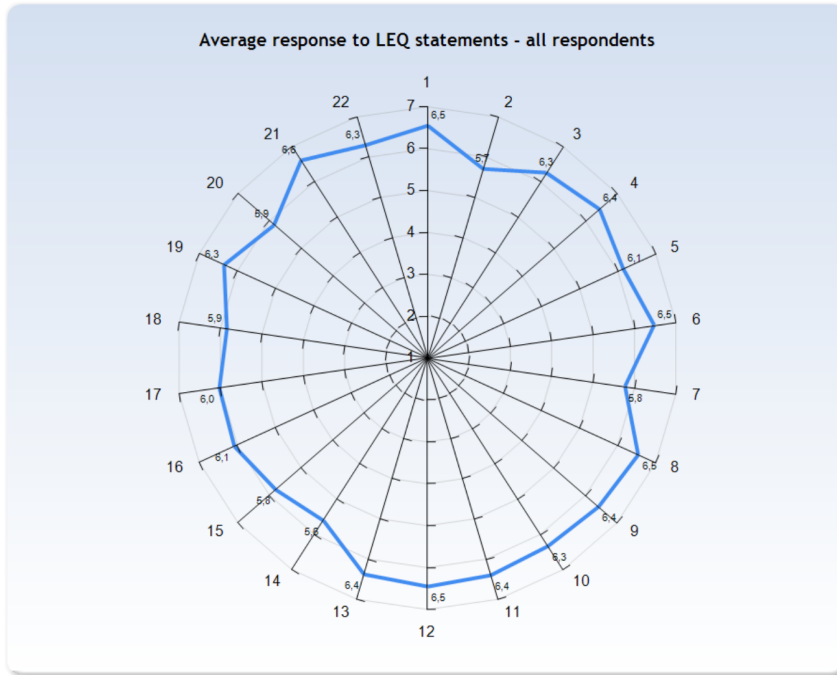
Another comments concerned the exam. Some student have previously expressed that they really liked to have the exam in Kista, but some students also expressed that they do not like it. Unfortunately, this is nothing we can change at the moment, because of how the administration is done at the schools.

Course Literature

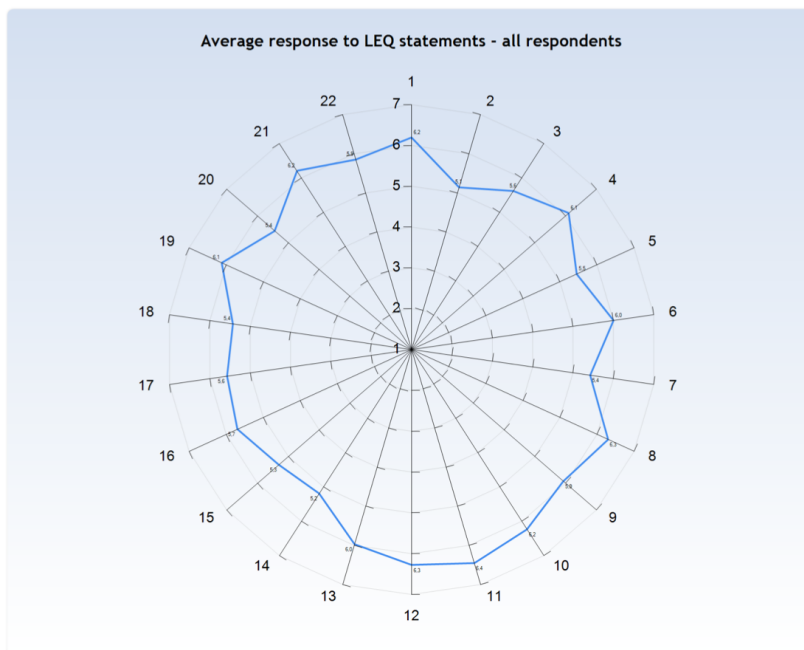
We receive only a few comments about the course literature, and these comments were very positive to the course books.

Learning Experience Questionnaire (LEQ)

The LEQ graphs shown below are part of the web-based course evaluation system. The first graph shows the results for 2016 and the second graph shows the result for the previous time the course was given (2015).



Result for fall 2016



Results for fall 2015

As we can see, the results are very stable and have slightly improved this year.

Meaningfulness - emotional level

Stimulating tasks

1. I worked with interesting issues

Exploration and own experience

2. I explored parts of the subject on my own
3. I could learn by trying out my own ideas

Challenge

4. The course was challenging in a stimulating way

Belonging

5. I felt togetherness with other course participants
6. The atmosphere in the course was open and inclusive

Comprehensibility - cognitive level

Clear goals and organization

7. The learning objectives helped me understand what I was expected to achieve
8. I understood how the course was organized and what I was expected to do

Understanding of subject matter

9. I understood what the teachers were talking about
10. I could learn from concrete examples that I was able to relate to
11. Understanding of key concepts was given high priority

Constructive alignment

12. The course activities helped me to reach the learning objectives efficiently
13. I understood what I was expected to learn in order to get a particular grade

Feedback and security

14. I regularly received feedback that helped me see my progress
15. I could practice and receive feedback without any grading being done
16. The assessment on the course was fair and honest

Manageability - instrumental level

Sufficient background knowledge

17. My background knowledge was sufficient to follow the course

Time to reflect

18. I regularly spent time to reflect on what I learned

Variation and choices

19. I could learn in a way that suited me
20. I had opportunities to choose what I was going to do

Collaboration

21. I could learn by collaborating and discussing with others

Support

22. I could get support if I needed it

Advice from Students

In the following section, we have copied and pasted some of the comments that students gave anonymously on the question "What advice would you like to give to future course participants?".

"Gör seminarierna."

"Boken är bra, läs den ifall du inte fattar."

"Gå på föreläsningarna, de var kanon"

"Delta i kursen från början och gå på föreläsningarna."

"Tentamen är viktig, 9hp, börja studera första veckan. B är ett rimligt slutbetyg. A är svårt då du måste studera ganska brett utanför kursen, och kanske ha tur för att sätta programmeringsfrågan (rekursiva funktioner i Assembly)."

"Gör seminarierna, de tar inte så värst lång tid att göra och ger bonuspoäng till den första delen av tentan."

"Gör seminarierna och övningarna "

"Gör nåt kul på miniprojektet. Följ med i kursen, och ha kul! Att seminariepoängen kan göra hela skillnaden mellan E och F. "

"Jag lärde mig mycket av att göra labbarna och ett avancerat projekt Gå på föreläsningarna så kommer kursen att vara en bris. Medverka på seminarier! Börja med labbarna i tid och att slidsen är superbra!"

"Se till att ni har allt ni behöver till mini projektet i tid. Tar lång tid att beställa konstiga teknikgrunkor. Börja i tid med projektet Gör alla seminarier och börja med labbarna i tid. Häng med hela tiden och försöka inte hamna efter."

"Börja i tid med projektet. Häng med på seminarierna och gör labbarna i tid. Gå på föreläsningarna, de täcker materialet på ett bra sätt. Börja på projektet direkt. Om du inte hittar information om protokoll - gör ett spel på displayen. Mer värt och man undviker onödig stress. Gör samtliga labbar ordentligt, finns massor av kunskap att hämta från dessa. Anmäl er till tentan! Jag glömde... Tycker dock föreläsaren kunde ha påmint oss.ligg i fas och plugga hårt. Jobba kontinuerligt med labbarna. "

"Starta med saker tidigt. Särskilt projektet. Ansträng er på projektet. Det är både roligt och lärorikt. Det här är en kurs som det är värt att kämpa för högt betyg i. Följ kursens planering och försök att hela tiden ligga i fas "

"Håll igång! Mycket gratiskunskap kommer om man går på föreläsningar, samt lägger mer tid en man trott på labbar. Sen att faktiskt fråga om man inte förstår. Att lägga tid på att arbeta tillsammans med både labbar och seminarieuppgifter, för att få bästa möjliga förståelse. Börja tidigt med projektet "

"Gör seminarierna och övningarna! De ger er en chans att öva på materialet och få feedback innan tentan. Gå på alla föreläsningar!"

"Go to the lectures and participate actively. Read the course literature (it's good!) properly. Write down stuff you think you want to have on your A4-summary continuously during the course. Thinking that you don't need to study for the exam because you can cram every topic of the course on an A4 is a terrible idea because you will not pass the exam that way."