



## Course Analysis, EQ2310 Digital Communication (HT23)

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This course analysis follows the structure of the standard KTH course analysis template.

### 1. Description of the course evaluation process

The course evaluation is based on student feedback collected in an LEQ that was sent out to the students after the final grade had been reported in Ladok, and personal reflections by the teacher. In the first lecture, students were invited to organise a student representation in the course, which unfortunately never was established. The students were also given the opportunity to comment on the course analysis in Canvas before it is finalized. However, no feedback was received.

Due to the low response rate (10%, 3 out of 30 responses), a detailed analysis of different student groups (e.g., gender, disabilities, student cohort) is not possible.

### 2. Description of meetings with students

In the first lecture, students were informed about course development and course analyses of previous years. The students were also encouraged to form a student representation. After the course, students were given the opportunity to comment on the course analysis in Canvas.

### 3. Course design

The course consists of 14 lectures and 14 tutorial sessions in Period 2 as well as a small project and a lab in the beginning of Period 3. The lectures convey the main content of the course. Since HT20, pre-recorded lecture material for all lectures exists and is provided to the students for preparation before the lectures and for following up after the lectures. The students are encouraged to complete reading assignments before the lectures, and Canvas quizzes are available to provide students with first feedback on their initial understanding. The tutorial sessions provide additional examples and focus on mathematical problem solving. In the project, the students implement a simple communication system in Matlab and compare the performance obtained by simulations with a mathematical model, and in the lab assignment, the students conduct simple experiments on a USRP software defined radio platform.

Since HT20, the examination of the course is based on continuous examination and a 5h written exam at the end of Period 2. The continuous examination consists of:

- Essay (ES): The essay is linked to ILO-1 and graded with grade a pass/fail grade.
- Oral Presentation (OP): The oral presentation is linked to ILO-2 and graded with grades C, E, and F.
- Homework Assignment 1 and 2 (HW1+2): The homework assignments are linked to ILO3 to 5 and graded with grades C, E, and F.



The written exam (WE) links to ILO-4 and is graded with grades A, C, or F. The grades from the essay, the oral presentation, and the homework assignments are reported together with the grade from the written exam in TEN1 as follows:

Grade TEN1	Requirement		
A	<ul style="list-style-type: none"> <li>WE passed with grade A</li> <li>OP, HW1, HW2 are all passed with grade C</li> <li>ES passed with grade P</li> </ul>		
B	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>WE passed with grade A</li> <li>OP, HW1, HW2 passed, and at most two of them are passed with grade C</li> <li>ES passed with grade P</li> </ul> </td> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>WE passed with grade C</li> <li>OP, HW1, HW2 are all passed with grade C</li> <li>ES passed with grade P</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>WE passed with grade A</li> <li>OP, HW1, HW2 passed, and at most two of them are passed with grade C</li> <li>ES passed with grade P</li> </ul>	<ul style="list-style-type: none"> <li>WE passed with grade C</li> <li>OP, HW1, HW2 are all passed with grade C</li> <li>ES passed with grade P</li> </ul>
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C	<ul style="list-style-type: none"> <li>WE passed with grade C</li> <li>OP, HW1, HW2 passed, and two of them are passed with grade C</li> <li>ES passed with grade P</li> </ul>		
D	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>WE passed with grade C</li> <li>OP, HW1, HW2 passed, and one of them is passed with grade C</li> <li>ES passed with grade P</li> </ul> </td> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>WE failed with grade F (or not attended)</li> <li>OP, HW1, HW2 are all passed with grade C</li> <li>ES passed with grade P</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>WE passed with grade C</li> <li>OP, HW1, HW2 passed, and one of them is passed with grade C</li> <li>ES passed with grade P</li> </ul>	<ul style="list-style-type: none"> <li>WE failed with grade F (or not attended)</li> <li>OP, HW1, HW2 are all passed with grade C</li> <li>ES passed with grade P</li> </ul>
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E	<ul style="list-style-type: none"> <li>WE failed with grade F (or not attended)</li> <li>OP, HW1, HW2 are passed, and at most two of them is passed with grade C</li> <li>ES passed with grade P</li> </ul>		
FX	<ul style="list-style-type: none"> <li>One of OP, HW1, HW2, ES is failed with grade F</li> </ul>		
F	<ul style="list-style-type: none"> <li>Two or more of OP, HW1, HW2, ES are failed with grade F</li> </ul>		

#### 4. Students' workload

The course credits of 7.5 hp in P2 translate into an expected full-time workload of 5 weeks and an average workload of roughly 22 hours per week over a 9-week period. Only one student reached this expected workload, and the remaining two respondents report half the workload or less.

#### 5. Students' results on the course

The following table shows the distribution of grades in this course round (including improved grades after the re-exam):

A	B	C	D	E	F
3	5	0	6	16	0

All students that have taken the course have passed the course. A closer look at the grades reveals that the grades follow a bi-modal distribution with one cluster at higher grades A and B, and one cluster at lower grades D and E. This is a side effect of the continuous examination, which allows students to pass with grades D and E without taking the exam and requires students to pass the written exam to obtain grades A-C.



Unfortunately, only 15 out of 30 students attempted the written exam, and only 8 out of these 15 students passed the written exam. In personal conversations with students, students explain that they prioritize courses with continuous examination during the lecture period and give priority to courses with traditional examination during the exam period. Free-text comments in the LEQ also reveal that it is challenging for students to keep up with multiple continuous examination courses running in parallel and to find the time for preparation for the final exam.

## **6. Students' answers to open questions**

A summary of the free-text comments is as follows: The responding students found the course interesting and appreciate the lectures, the preparatory concept questions in Canvas, and the continuous examination. The students point to the lecture videos and the textbook as areas of improvement; e.g., the lecture videos were sometimes perceived as too fast. Students also point out that it is hard to keep up with multiple continuous examination courses running in parallel and to find the time for preparation for the final exam. To future course participants, the students recommend participating in the tutorials and to also refer to other textbooks.

## **7. Summary of students' opinions**

The responding students were very satisfied in all aspects, resulting in high average scores. The lowest average score across all the questions was 6.3 on scale from 1 to 7, showing that the student highly agree that learning activities and assessment promote learning and are well aligned with course goals.

The students' feedback in response to the course analysis: No feedback has been provided.

## **8. Overall impression**

As in the previous years, the course is very well received by the responding students, and there are no indications that there are major issues in the course. However, the (perceived) lecture attendance is too low (only 25%), and 75% of the grades at level D or below is not a good result for the course (see as well Section 5). Especially, the low participation rate in the lectures is problematic since it makes interactive lecture elements like discussion of concept questions more difficult; students (presumably) feel exposed and do not engage in discussions as anticipated. The relatively large number of low grades is furthermore frustrating at a personal level since I as a teacher want my students to perform strongly, but also problematic from a societal perspective since Sweden is in urgent need of competent engineers to tackle current and future challenges.

## **9. Analysis**

We attribute the relatively low number of participating students in the lecture to the general change in the students' study behaviour, preferences, and expectations that we have observed since the pandemic. The provided course material and organization (course structure, Canvas room, lecture videos, timely release of continuous examination in Canvas with well-defined instructions and deadlines) allows for a lot of flexibility and independence of the students, and students who are used



to and prefer to study on their own, find good conditions for this in this course. At the same time, the classroom lectures provide a stable context for students who feel that they need it or who prefer the possibility to interact with the teacher. A negative side effect is as it seems that students become detached from the course and the teacher and simply do not care enough about the course. The low response rate to the LEQ on the one hand and the students' prioritization when it comes to the examination reflected in low grades on the other hand (see Section 5) support this hypothesis.

Looking at reported work load over the past years, there is not strong evidence that the course and the continuous examination is too demanding.

#### **10. Prioritized course development**

To trigger more engagement with the course and to improve examination to yield more balanced grades, we suggest to

- Investigate how Canvas quizzes *following up* on lectures (in addition to preparatory quizzes) can be used to complement the continuous examination with smaller regular assignments (e.g., 2-3 quizzes á 15 min per week) that are also designed to inspire and trigger curiosity.

As utilized by online-learning apps like duolingo, sending properly timed reminders that motivate to complete these quizzes can be effective for increasing student engagement. If the follow-up quizzes furthermore generate bonus points for the written exam, chances are good that the threshold for participating in the final exam is lowered. Alternatively, the results from the quizzes could be used to “unlock” higher grades than D.

- Investigate how the classroom lectures can be handled more resource efficient. Different solutions can be considered; e.g., moving lectures to smaller rooms that will only fit half of the expected student group, or replacing the lectures by one weekly Q&A session.

#### **11. Other information you want to share**

None.