

Course analysis

General information

This document provides the course analysis about the master degree course

Signal Theory EQ 1220

given in the first period in 2017. The course responsible was Tobias Oechtering, Information Science and Engineering Department, EES, KTH. Email: oech@kth.se, tel.: 08 790 8462. The tutorials and projects were given/guided by the teaching assistants Marie Maros and C. V. Ramana Avula Reddy.

Course organization:

- 12 x 2h lectures
- 12 x 2h tutorial given in two groups with group work
 - o 5 voluntary group solutions can be handed in
- 5 voluntary reflective questions essays/ 2 voluntary problems
- 1 online knowledge diagnostic test
- Two mandatory take home project assignments
- One written exam and a re-exam, each 5h.
- 10 Online quizzes with 72 question in total (new)

Requirements:

- Passed project assignments (PRO1: 1cu, PRO2: 1cu) , grading: passed/failed
- Exam (TEN: 5.5cu), grading: A-F
 - o Exam consists of two parts:
 - Part A: Questions, graded pass/fail,
 - Part B: Problem solving, graded only if part A passed and graded A-F

Material:

- Lecture notes: "Signal theory" by P. Händel, R. Ottoson, H. Hjalmarsson, and M. Jansson.
- Collection of problems in Signal Theory
- Old exams available on the course homepage
- The KTH table of signal processing formulas (in English)
- Two project assignments (made available online during the class)
- Report templates in Word & Latex
- 5 reflective question sets for reading assignment
- 1 knowledge diagnostic test
- 5 lectures where clicker were used for student feedback
- Lecture slides
- Solutions from suggested tutorial problems
- Recapitulations and solutions of tutorial problems available on canvas

Statistics

- 59 students registered for the course EQ1220 from programs: TINNM, TIVNM DMTE, CELTE, CFATE, CINTE, TMLEM, TSCRM, TTLSM, TEBSM, and exchange students

All students have to do two homework project assignments, which are allowed to be done in groups of at most two. The students have the opportunity to revise their project report after a first evaluation of the project report.

Project 1:

- 6 passed and 43 failed in the 1st round and 43 passed in the 2nd round.

Project 2:

- 2 passed and 47 failed in the 1st round and 47 passed in the 2nd round.

Exam written on Oct 27th, 2017, 8:00-13:00: Results see *Section Exam results*

Re-exam written on Dec 20th, 2017, 14:00-19:00: Results see *Section Exam results*

Course history and development

This was the seventh time that the teacher gave this course after 2011. No major changes were done on the covered topics, but some slides and derivations on the board were revised, in particular examples and more clicker questions were added and revised.

This year we transferred the course page to the Canvas system including the handling of the essay and project assignments. Additionally, we added 10 online quizzes using the functionality offered in Canvas with 72 quiz questions in total. The quizzes were not mandatory and should help students to test their understanding of the lecture material. We gave high quality formative feedback on both first submissions of project reports.

We kept the new style of the exam with a mixture of problems. In particular one 'guided problem beyond the course book' where we test if students are able to apply the concepts and methods taught in the course to derive new result with strong guidance. This type of problem should test the depth of the understanding of some fundamental concepts. In addition, we include a problem that is formulated in a more engineering problem context that however can be directly solved with the tools and results from the lecture. This type of problem requires students more to identify what method is appropriate to solve the problem. The remaining problems are easy to advanced variations of standard problems from the tutorial to test the 'mechanics' of problem solving skills.

We kept the responsibility matrix to have a clear distribution of responsibilities, assignments and deadlines of the tasks in the teaching team. The responsibilities were discussed and distributed before the course in an early course-planning meeting in June. Both TAs followed well the plan, were very reliable and dedicated. Ramana was TA for the first time. Marie provided good support and guidance.

Course feedback and discussion

The questions and the answers can be found in *Appendix Course Evaluation Results* using survey tool *artologik*. Further, the teacher collected feedback from the TAs.

The feedback from the students shows that most of the students are happy with the tutorial style, reading assignments, projects, bonus point system, diagnostic test, clickers and lectures. The students are this year very critical. Overall, the course is well appreciated and does not require major changes. There might be room for improvement in some lectures and tutorials. In more detail:

- Some students do not value the lectures since they sufficiently studied the material in the reading assignment. The teacher believes that this applies only to the good students, but average and in particular weak students strongly benefit from both activities so that this setup is kept until a better setup is found.
- Some students valued one TA more than the other. Since Marie is more experienced, it can be expected that the quality of her teaching is better. However, the teacher is convinced that Ramana is dedicated and the quality will improve with more experience. To speed up the process, we will have some joint tutorials where both TAs teach together and the teaching team will meet more often to discuss the teaching.
- We considered the opportunity to replace the essays of the reading assignments by online quizzes, but half of the students believe that essays are worth the effort. We will look into this in future.
- Most of the students considered the difficulty of the course to be ok or tough. This is exactly the difficulty level the teacher aims for – challenging but not too hard.
- I will continue to look for opportunities to reduce/simplify derivations and spend more time on teaching the concepts, e.g. by adding more clicker questions and looking for more alternative proofs and additional explanations. There were already again several new explanations. This time I did not have the time to do the summary at the end because the content in the lecture grew. I assume that the complaint about handwriting and unclear explanations is with respect to speeding up to the end in two/three classes where I wanted to finish the material – this should be avoided and content has to be reduced again. However, since the reading assignments should not replace lecturing the content, I will keep teaching the material in class. I might put some lengthy derivations on slides and discuss only the crucial steps, perhaps interactively using clickers if time allows. However, I am not going to skip the derivations since I think it is important to point out recurring steps in derivations, including conceptual ones, which perhaps reaches only good students.

This year exam results were slightly below expectations. We expected that only a few students would be capable to solve large parts of problem 5 and that some would have difficulties with problem 4. However, problem 2 was a combination of two tutorial problems, which we considered to be an 'easy' problem, but unfortunately several students had problems. We do not have an explanation for this. Some students complained about the difficulty of the exam but accepted after explanation that it everything was within their range. However, the solution of the exams very well revealed strengths and weaknesses of individual student so that we consider the exam to be fair. To prepare students better, we will try to communicate our expectations even more. We already have two tutorials where exam problems are solved and we included the opportunity to trade a reading assignment with solving exam problems. We will look for more opportunities, but in any case we will explicitly

refer to old exams and advise students to get familiar with the difficulty level of the problems. The re-exam went well. The outcome was more or less as expected.

STEX were not able to organize guards for the exam so that PhD students had to help out. The implementation was not smooth. This process needs to be improved and monitored more. However, I expect improvement to normal high quality operation in future.

A standing problem is the large variety of the background of the students. The diagnostic test helps students to become aware of the expected background and perhaps the provided links to material helped some students to catch up. It also showed that this year the background of the students was better than in the previous year, but worse than two years ago. It will be interesting to see if this correlation can be identified also in future. As in the years before, for a few students the pace of the course is too fast and the difficulty too tough (2). For most students the difficulty of the course is Ok (18) or tough (14) and a few students consider the difficulty of the course to be easy (3). The teacher will continue to look for more teaching ideas to help those students who have problems/insufficient background knowledge.

Ideas for future course development

The following actions are suggested based on the experiences from the teacher team and the response from the students as well as from previous years:

- Add a lecture where a speaker from Ericsson is invited (contact alumni), purpose is to enhance the intrinsic motivation of the students. Perhaps the visitor could bring/state a problem from industry
- Have joint tutorials where the TAs jointly teaches the students.
- For lengthy derivations, in particular to the end of lectures, consider to put parts on slides and find ways to teach them without long derivations on the board – perhaps leave empty boxes on the slides, which are then written on the board or use clickers for the next step if time allows.
- For lectures with added material, look what can be removed or move optional to the end.
- Look for more small examples and possibly in-class experiments/simulations.
- Look for more additional reading or topics beyond for the interested student.
- Continue with the new style of exam problems and communicate this clearly so that the expectations are clear.
- Revise/look for more tutorial problems with an engineering context.
- Discuss exam problems earlier in the tutorial session so that the expectations become clear.
- The operation of STEX needs to be monitored.
- Take care that in each tutorial are equally many students, e.g. ensure that students go to the designated group or have one tutorial where both TAs are present at the same time.
- Provide weekly a problem (“Problem of the week”) where students should derive and prove results. The excellent students are the target group who aim for PhD studies. It should be voluntary and the students get formative feedback on their solution.

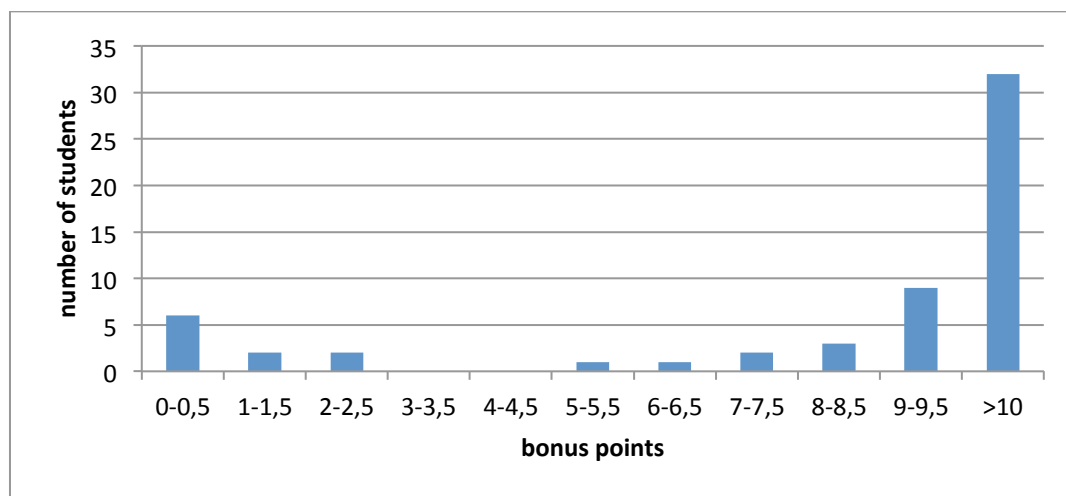
Overall evaluation

I believe that the course is on a very good level and well appreciated. The teacher got told from other teachers that second year master students communicated their appreciation of the good basis provided in this course. However, the expected difficulty level in the exam should be communicated more and we should aim for equally high teaching quality in both tutorials and lectures.

Bonus points statistics

5+5+1 bonus points from 5 reading assignments, 5 tutorials, one from the diagnostic test

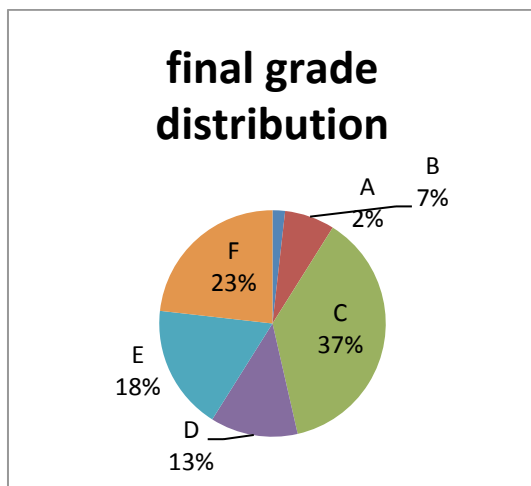
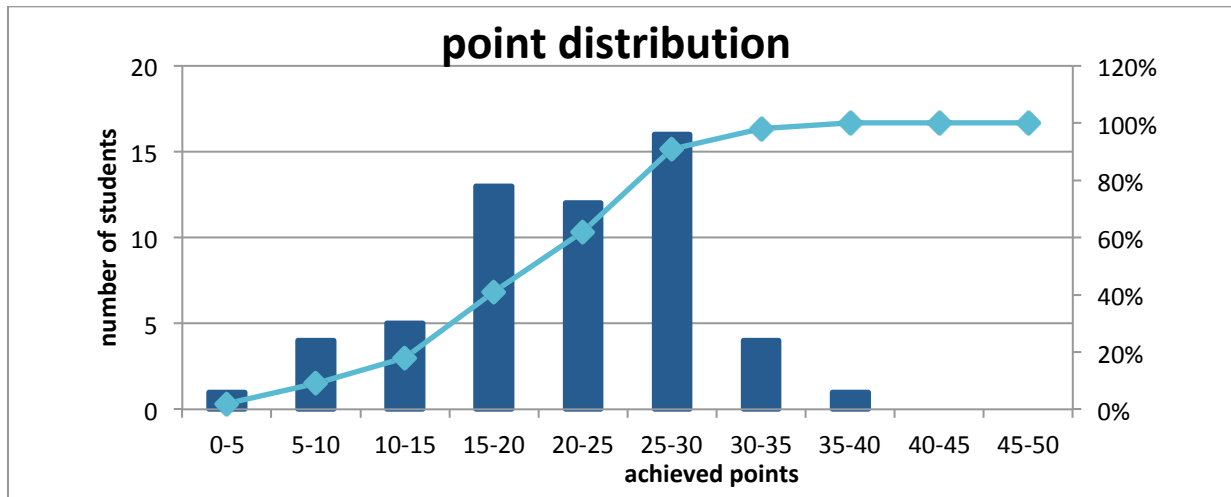
Bonus points count for part A of the exam where 8 points were required. 50 students participated in obtaining bonus points, 43 obtained more than 8 points.



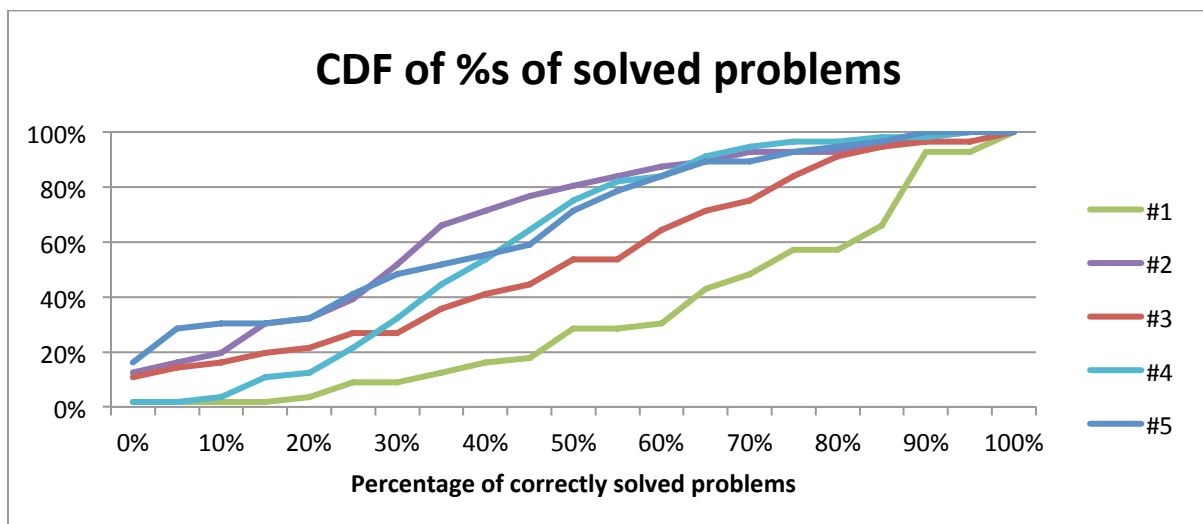
Statistics exam results

Exam 2017-10-27

Number of students EQ1220: 56

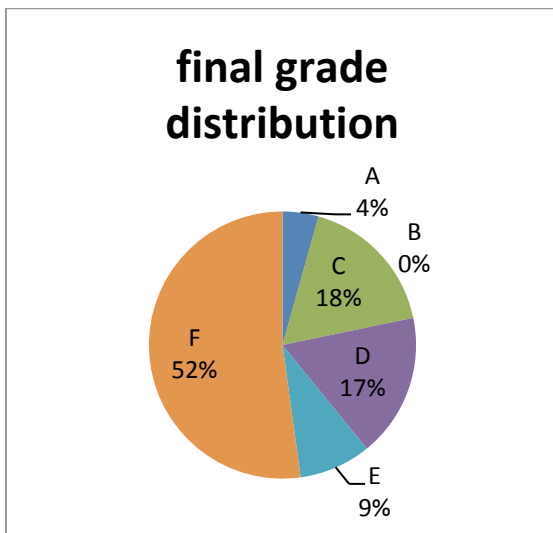
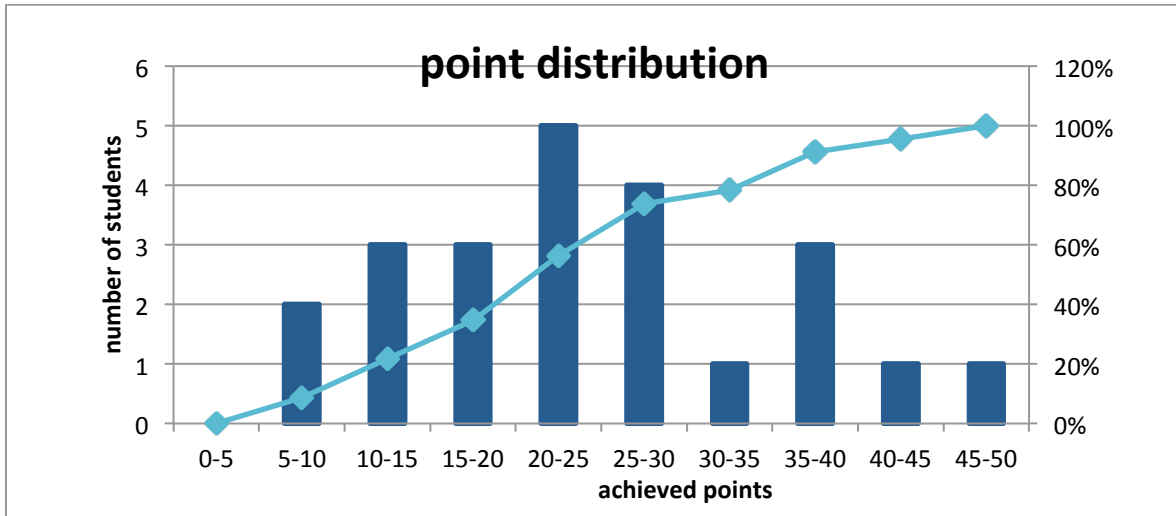


Grade	Points	Number of students
A	37-50	1
B	30,5-37	4
C	23,5-30,25	21
D	20,5-23,25	7
E	17-20,25	10
F	0-17	13

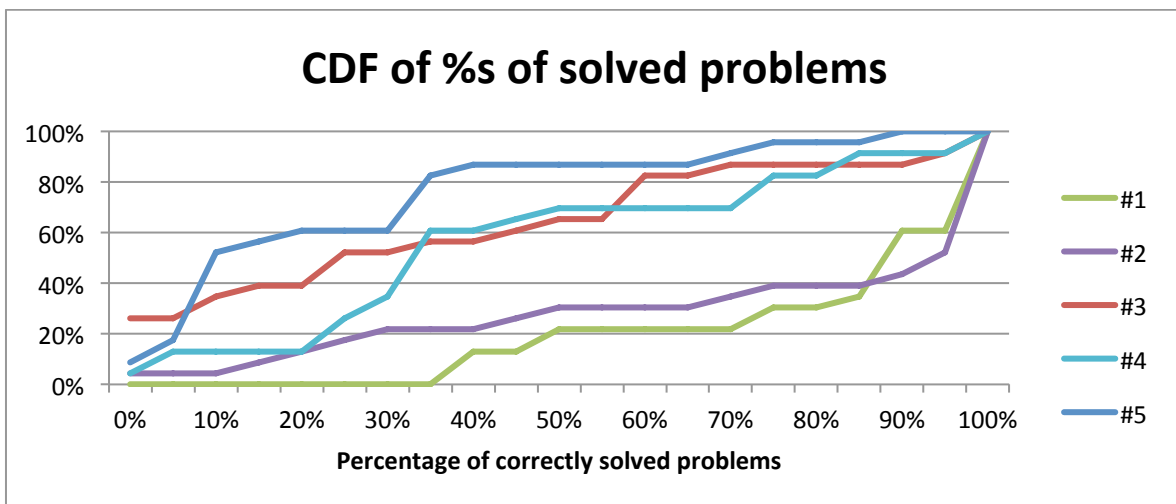


Re-Exam 2017-12-20

Number of students EQ1220: 23



Grade	Points	Number of students
A	45-50	1
B	40-44,75	0
C	34-39,75	4
D	27,25-33,75	4
E	22,5-27	2
F	0-22,25	12

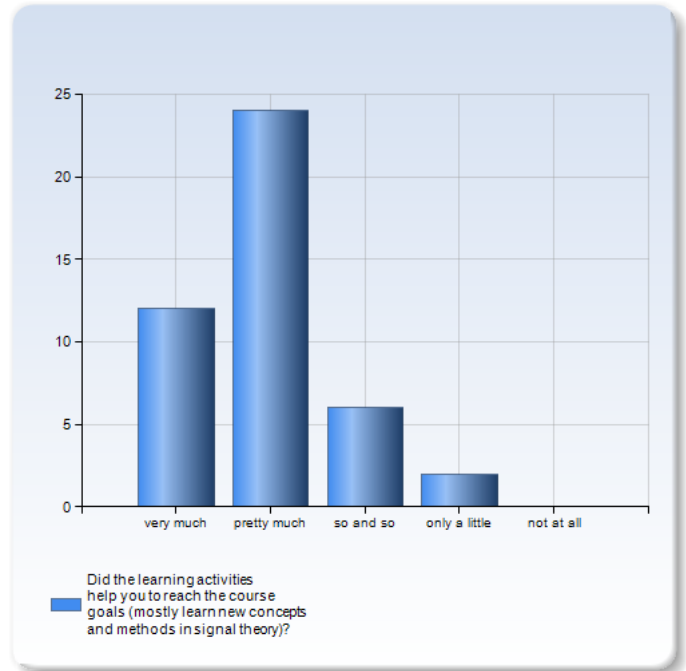


EQ1220 Signal Theory 2017

Respondents: 54
Answer Count: 44
Answer Frequency: 81.48 %

Did the learning activities help you to reach the course goals (mostly learn new concepts and methods in signal theory)?

Did the learning activities help you to reach the course goals (mostly learn new concepts and methods in signal theory)?	Number of Responses
very much	12 (27.3%)
pretty much	24 (54.5%)
so and so	6 (13.6%)
only a little	2 (4.5%)
not at all	0 (0.0%)
Total	44 (100.0%)



Please feel free to add a comment.

Tutorial sessions were very good in my opinion. The reflective questions task could be substituted by more exercises project, reflective questions and exercises were useful

I learned Signals and Systems and Discrete Signal Processing in my undergraduate school, however these two courses did not pay much attention to the probability and stochastic calculations. I actually learned a lot from EQ1220 especially from the mathematical aspect of the concepts and methods.

The quizzes in canvas has been very useful. Even so, I would prefer to answer that question after having had the exam, as now it is difficult to evaluate the knowledge acquired throughout the course

About the project assignments, I think it would be good to set at least one session where we could come and ask questions to the TA for each project, because the problem here it is if we were stuck we had no way of moving on and also to know if we were completely on the wrong path... However the project assignments were very cool to see concrete applications of what we learned, I liked it !

good presentation of new concepts and practice of new methods

The learning activities are valid to urge me to learn. However, it mostly depends on myself to reach the goals.

I thought that the project were interesting while not long enough and I felt that they were half as interesting as they could be, and the report are too thin to go deeper into the problems.

The reflective questions were probably the worst things to do. Though, not mandatory, it still felt like we should complete them but simply defining a term does not help with the application and full understanding of the concept. Yet, writing those answers still took so much time and it felt like it was distracting me from actual, productive studying.

Threshold concepts are core concepts that once understood, transform perception of a given subject. What threshold concept(s) did you learn in the course?

Threshold concepts are core concepts that once understood, transform perception of a given subject. What threshold concept(s) did you learn in the course?

Stochastic processes

how to deal with stochastic signals

stochastic processes

statistical properties and how to use them to solve problems

Filtering, Convolution between time and frequencies domain, Wide Sense Stationarity

signal transformations, mathematical view of a filter, Fourier transform changing to frequency domain

WSS, AR process, fourier transfer

wiener filter

What I learned in the course about threshold concepts is to start from the basic definitions and then apply basic theorems to result in complex physical intuitions or mathematical properties.

Wide Sense Stationary and Fourier Transform.

Stochastic Variables and Processes, Wide-sense Stationary Processes, Stationary Ergodic Processes, Power Spectral Density

The theorems of probability, the Parseval formula, smart zeros

LTE system

First two moments of a random variable, stationarity, filtering and convolution

Fourier transform (and the inverse transform) : from time domain to frequency domain.

Random Processes, Estimation

stochastic processes, acf, power spectrum, sampling and recovery

PAM, aliasing, reconstruction of signal and so on

wiener filter

Stationarity, IID

stochastic process

power spectrum

Just the concept of stochastic processes

fourier transform

power spectrum, correlation, reconstruction, filtering

Stochastic processes

mean, variance, acf

N/A

Ergodicity

MMSE, SNR

stochastic process and their characterization, power spectrum, ARMA, filtering etc.

stationary stochastic process

Stochastic processes, ergodicity, power spectrum, estimation theory, sampling and reconstruction

Stochastic Processes and their characteristics, Estimation, Filtering, Signal Reconstruction

Stochastic processes, power spectrum, sampling theorem

BIBO stability

Fourier transform

optimal filter, sampling

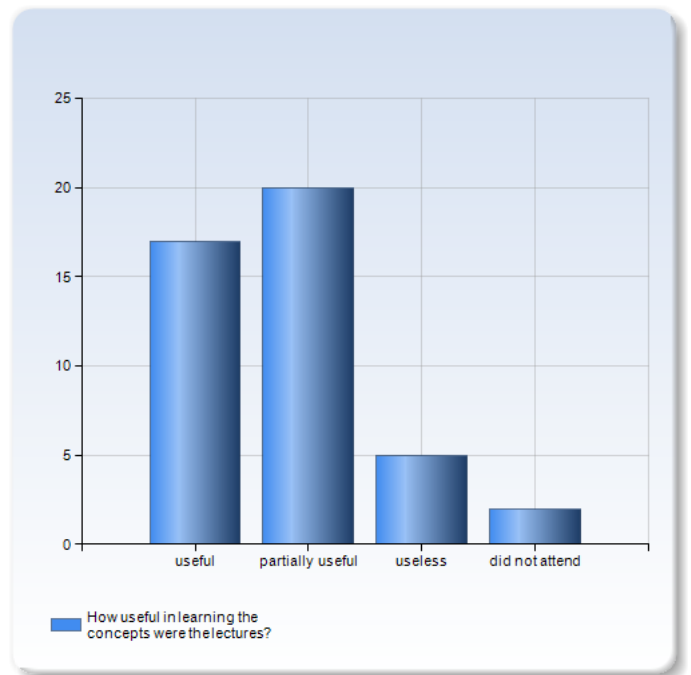
Nyquist frequency

Time domain and frequency domain, power spectrum and ACF

How to optimize the filter (Wiener Filter and Yulke-Walker equation) mostly, because it's not just theoretical but also practical.

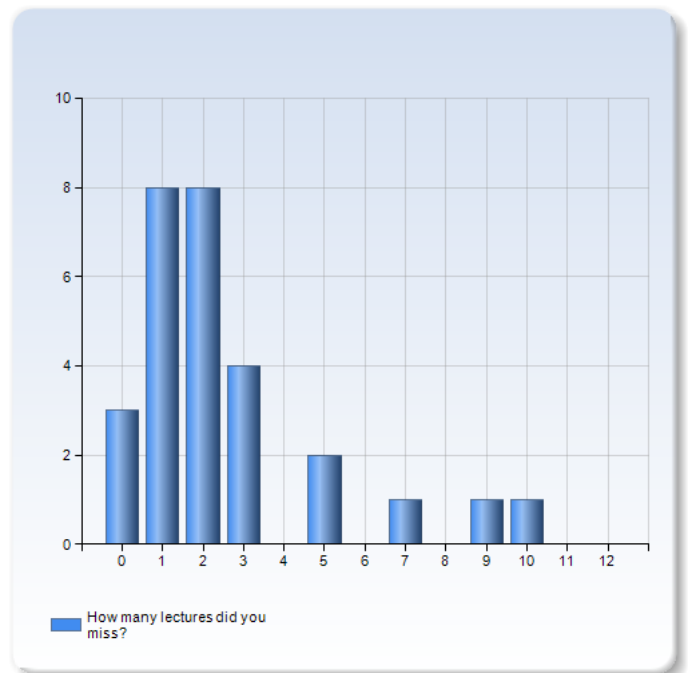
How useful in learning the concepts were the lectures?

How useful in learning the concepts were the lectures?	Number of Responses
useful	17 (38.6%)
partially useful	20 (45.5%)
useless	5 (11.4%)
did not attend	2 (4.5%)
Total	44 (100.0%)



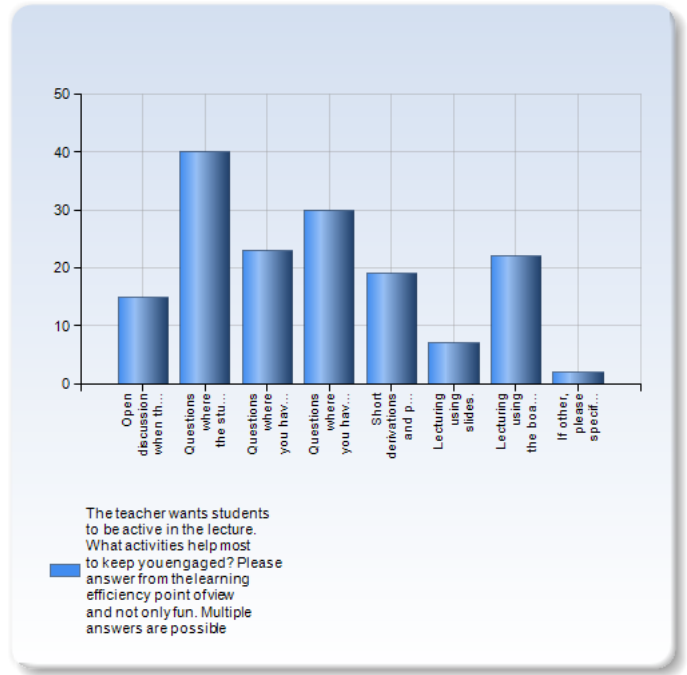
How many lectures did you miss?

How many lectures did you miss?	Number of Responses
0	3 (10.7%)
1	8 (28.6%)
2	8 (28.6%)
3	4 (14.3%)
4	0 (0.0%)
5	2 (7.1%)
6	0 (0.0%)
7	1 (3.6%)
8	0 (0.0%)
9	1 (3.6%)
10	1 (3.6%)
11	0 (0.0%)
12	0 (0.0%)
Total	28 (100.0%)



The teacher wants students to be active in the lecture. What activities help most to keep you engaged? Please answer from the learning efficiency point of view and not only fun. Multiple answers are possible

The teacher wants students to be active in the lecture. What activities help most to keep you engaged? Please answer from the learning efficiency point of view and not only fun. Multiple answers are possible	Number of Responses
Open discussion when the teacher asks students and the answer is developed jointly.	15 (34.1%)
Questions where the students use clickers for their feedback.	40 (90.9%)
Questions where you have discussions with your neighbor before open discussion.	23 (52.3%)
Questions where you have discussions with your neighbor before using clickers.	30 (68.2%)
Short derivations and problems solving done in class by the students.	19 (43.2%)
Lecturing using slides.	7 (15.9%)
Lecturing using the board.	22 (50.0%)
If other, please specify	2 (4.5%)
Total	158 (359.1%)

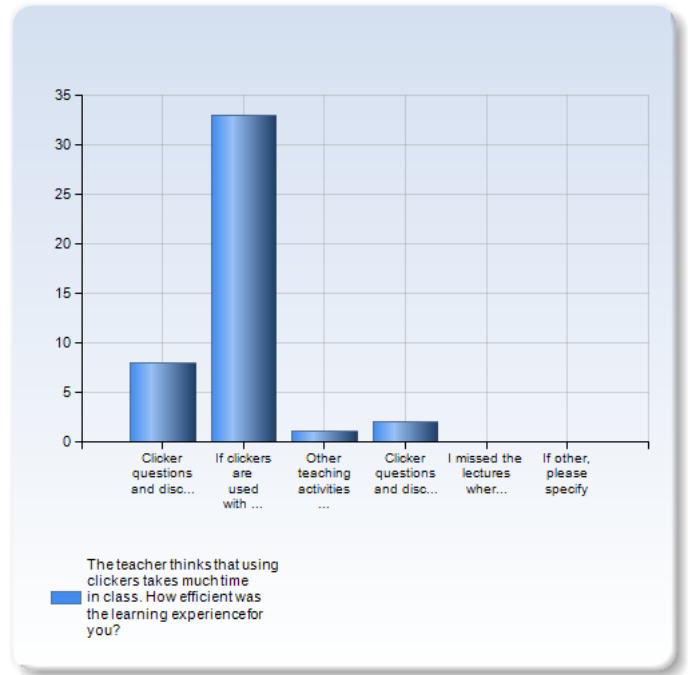


If other, please specify
 Fundamental explanation of concepts
 Reflective question

Please feel free to add a comment.
 The idea of giving us some time to work on problems during lecture is very helpful
 Too much derivations may sometimes make me feel dizzy.....and could not concentrate as well as in the previous class.
 Derivations on the board where sometimes really too long, at one point I just couldn't concentrate anymore and thought about something else, and my friends too. Also sometimes it was very hard to see what was written, with weak pens of the slides covering part of the derivations on the board.
 Using slides is pointless for a technical class such as Signal Theory, but most concepts were though with slides!
 not so useful to have a student at the board doing a derivation we all had to do on paper, but discussion with neighbors and clickers were very useful to perfect comprehension of concepts
 If the handwriting is more clear to identify, it could be better.
 Having discussions is always the best way to go as it forces people to use what they just learned, and since you have to use it you can be corrected on the spot just after you learn something incorrectly
 I think the clicker is very useful, because we can not only know what we think, but also know what others think, and pay attention to those important knowledge points.
 What keeps me most engaged is seeing someone who teaches with passion and truly wants students to enjoy and understand a subject. I want a professor who does not primarily rely on lecture slides as a form of teaching. It's hard to write reasonable notes from lecture slides because the pacing is off. It would also be helpful to see more fully worked through problems not just ones done by the students but the professor. I want to see what your thought process is when approaching a question rather than having us guess at an approach.
 In some lectures I felt the teacher spent too much time writing detailed calculations for some examples/proofs/derivations. It also didn't help when the whiteboard pens were almost empty and it was hard to see the writing on the board. Most of the time the lectures using the board were helpful, as I tend to pay more attention while note taking.
 Using the board is, according to me, the best way to keep student engaged. You really see the thinking of the teacher and how he reach the final point.

The teacher thinks that using clickers takes much time in class. How efficient was the learning experience for you?

The teacher thinks that using clickers takes much time in class. How efficient was the learning experience for you?	Number of Responses
Clicker questions and discussions provide the best learning experience and are always worth the time.	8 (18.2%)
If clickers are used with good questions and adequate discussions, the learning experience is worth the time effort.	33 (75.0%)
Other teaching activities provide similar understanding and are more efficient.	1 (2.3%)
Clicker questions and discussions are not worth the time.	2 (4.5%)
I missed the lectures where clickers were used.	0 (0.0%)
If other, please specify	0 (0.0%)
Total	44 (100.0%)



Please feel free to add a comment.

I think this is fun and makes people who get easily bored, more interested.

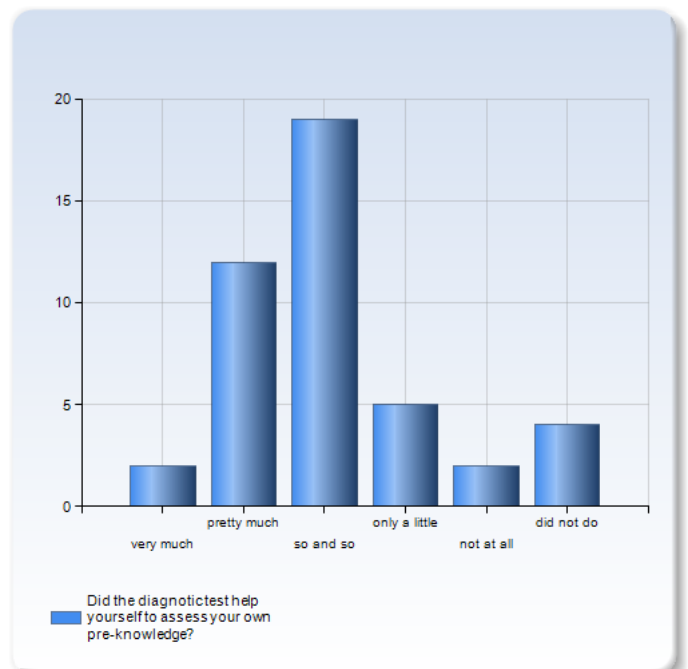
always better than raising your hand as one can be shy or it goes too fast. clickers are worth it I think

If using clickers takes much time, we can vote by show of hands to answer the questions.

I think the clicker questions are most helpful as a 'recap' or with question on concepts that have been covered before.

Did the diagnostic test help yourself to assess your own pre-knowledge?

Did the diagnostic test help yourself to assess your own pre-knowledge?	Number of Responses
very much	2 (4.5%)
pretty much	12 (27.3%)
so and so	19 (43.2%)
only a little	5 (11.4%)
not at all	2 (4.5%)
did not do	4 (9.1%)
Total	44 (100.0%)



Please provide any comment regarding the diagnostic test.

half of the diagnostic test was about systems, I was really afraid because I never learned anything about systems but that was almost never a problem, we almost never used complicated things about systems

When I did the diagnostic test, I have kind of forgotten lots of things about the concepts and not so familiar with the methods. However as I did the test one question by one question, lots of memory came to me.

In my opinion, it would be better to group all the questions in different topics, so that, given the case that someone has never heard about a certain topic, he/she can skip the topic and does not spend 1 minute selecting the 'I don't know' option of all the unknown questions.

I didn't find where we could see which grade we got to the diagnostic test. I know there were the solutions after doing it but it was hard to remember which questions I answered correctly and which were wrong.

The last part of diagnostic test (related to signal systems) was difficult for me since I don't have any pre-knowledge about it.

For the diagnostic test we had to remember details that were not necessarily related to this course. Still, it was useful.

had a hard time finishing the test as not only concepts but also mathematical skills were tested (but maybe it was the goal) and I wasn't mentally ready of the challenge (mostly tried in my head instead of doing full derivations) but still showed me what I knew and what I had to revise

It was pretty remote from the course material I think

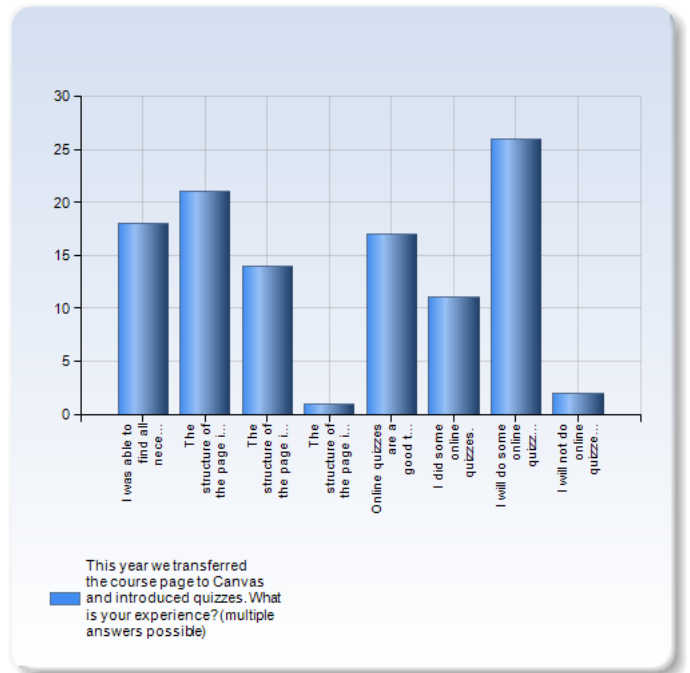
I did not get the mail even though I was in the list..

The diagnostic test was a bit long and I think most people at some point stopped putting the full effort in when answering the questions.

We didn't have a diagnostic test (I think ?).

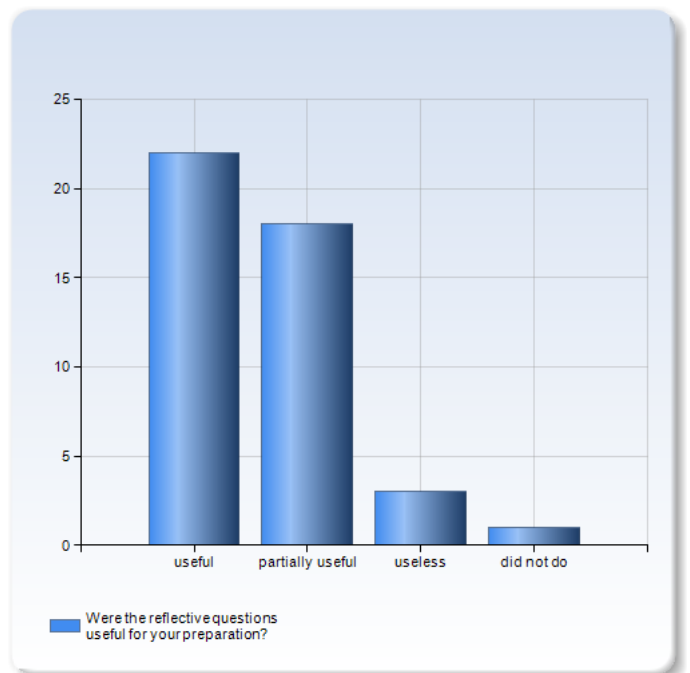
This year we transferred the course page to Canvas and introduced quizzes. What is your experience? (multiple answers possible)

This year we transferred the course page to Canvas and introduced quizzes. What is your experience? (multiple answers possible)	Number of Responses
I was able to find all necessary information.	18 (40.9%)
The structure of the page is good.	21 (47.7%)
The structure of the page is ok.	14 (31.8%)
The structure of the page is confusing.	1 (2.3%)
Online quizzes are a good tool to check basic understanding.	17 (38.6%)
I did some online quizzes.	11 (25.0%)
I will do some online quizzes for the exam preparation.	26 (59.1%)
I will not do online quizzes.	2 (4.5%)
Total	110 (250.0%)



Were the reflective questions useful for your preparation?

Were the reflective questions useful for your preparation?	Number of Responses
useful	22 (50.0%)
partially useful	18 (40.9%)
useless	3 (6.8%)
did not do	1 (2.3%)
Total	44 (100.0%)



Please feel free to add a comment.

In my opinion, "forcing" the students to do this task in exchange for points which are required to part A of the examination is not a good idea. The reason is that part A of the exam in itself is quite unfair in my opinion. Most of the students study more than one course per period, and the fact of having multiple assignments per week, actually prevents students to try to find a balance when studying for multiple courses. On top of that people working while studying are severely damaged by this approach

I think the concept of the reflective questions is really good and should be kept. The bonus points motivated me to do the assignment. The reflective questions helped me to prepare for the lecture. Therefore it was possible for me to understand more during the lecture.

quite a lot of work to do that every week but it's useful

The only thing is that the feedback is a little slow.

There has been cases when I found it very useful, but other cases where I found it useless. If you do the diagnostic test and see that very few people know about a certain topic, I do not see the point of making that person learn about that topic before taking it in the class. A person learning wrongly about a topic will have more difficulty later on to unlearn and learn again it correctly than someone who learns it correctly from the very beginning.

This forces us at least to read part of the course book and have an idea of what the course will be about, I think it is useful.

They are useful as you mentally prepare for the next lecture. However, revising them was basically pointless because most people could write the correct answers the first time, and I always struggled to come up with something to write for the revision.

good thing to dig into the material before the lecture

Because I had to do them, I started to do them and miss the lectures as I had to understand the material before the lectures.

So I don't think that they are useful, because either you do them after the lectures and they take the time of the exercises, either you do them before and the lectures become useless.

Very good to arrive prepared at lessons

Takes a bit too much time (especially because we have to do all of them twice, when sometimes it is not needed...)

Again, they took way too much time for how little knowledge was gained from doing them.

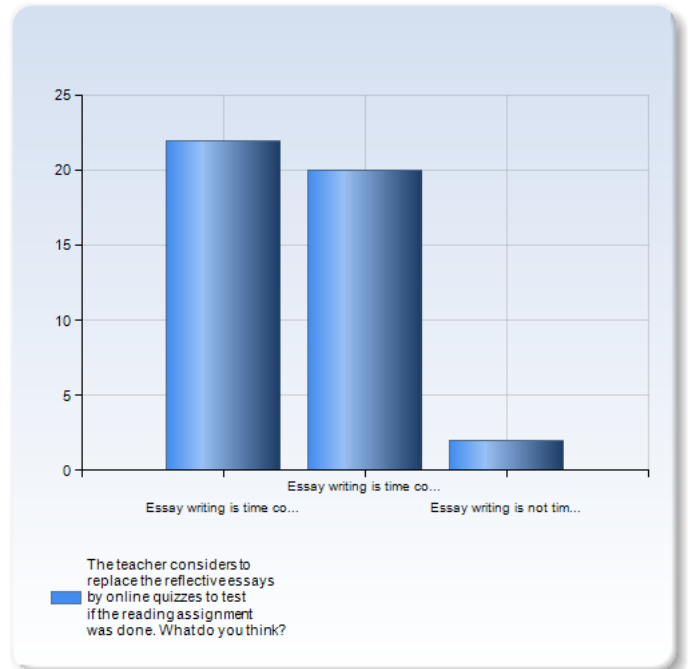
It forces us to read the course book and it's great. The feedback we get on this is great also.

It makes us to preview the lectures and it is helpful.

The reflective questions are one of the best ways to learn and to assess that we have understood the concept.

The teacher considers to replace the reflective essays by online quizzes to test if the reading assignment was done. What do you think?

The teacher considers to replace the reflective essays by online quizzes to test if the reading assignment was done. What do you think?	Number of Responses
Essay writing is time consuming and online quizzes will reach the same goal.	22 (50.0%)
Essay writing is time consuming, but a better learning activity than online quizzes.	20 (45.5%)
Essay writing is not time consuming.	2 (4.5%)
Total	44 (100.0%)



Please feel free to add a comment.

Formulating the essay helped me a lot to understand the concepts. I don't think that an online quiz will have the same effect.

Actually I think both are good.

Online quizzes would be very useful if they are done 2-3 days after taking the lectures. That way, everyone will try to understand the material after each class and will ask more questions if there are doubts after answering the quiz questions. I find it useless to assess the pre-knowledge of a person about a certain topic without explaining anything to that person before taking the quiz.

If the answer will show after the quizzes has been down, I may ask someone for the answer. But Essay writing let me to read the book carefully and with own thoughts. I prefer more with the reflection.

There should be several attempts possible for the online quizzes. I am not sure it is a good idea, because people could answer just randomly or not understand why they got the right/wrong answer, whereas in the essay since we formulate sentences we have to justify what we say. However online quizzes are more fun and faster.

Please do that! Online quizzes are much better!

if you want to save time just drop the step where we have to comment it and hand it in in class. Just note the uploaded essay

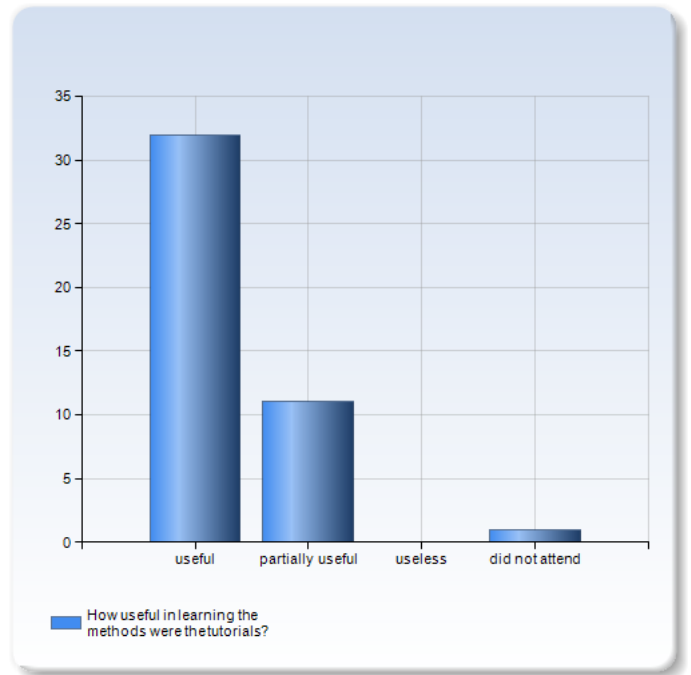
I think that multiple choice questions are never 100% fair, with open questions you can compensate in case there is a misunderstood question

I think each has their pros and cons. The reflective questions probably a better learning activity but since they take so much time students might skip them altogether and then quizzes that take less might be more helpful.

I think both are ok, and tests may be helpful to exams

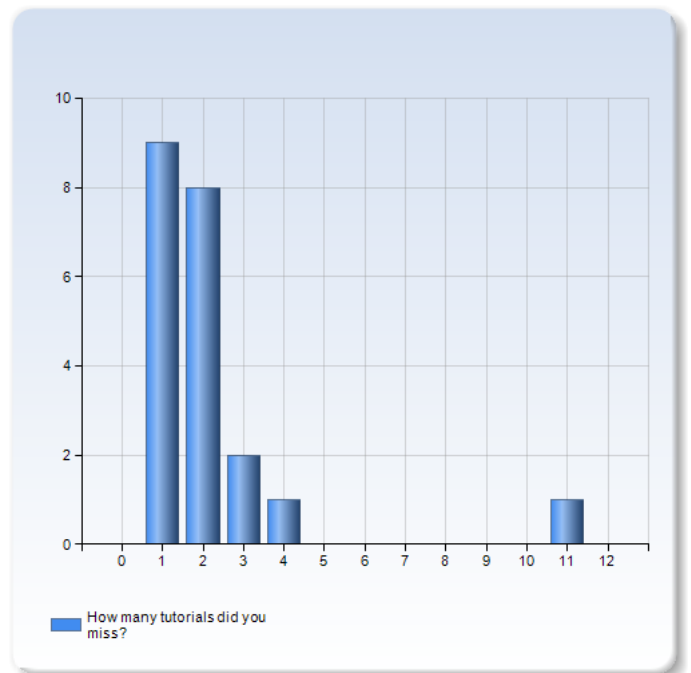
How useful in learning the methods were the tutorials?

How useful in learning the methods were the tutorials?	Number of Responses
useful	32 (72.7%)
partially useful	11 (25.0%)
useless	0 (0.0%)
did not attend	1 (2.3%)
Total	44 (100.0%)



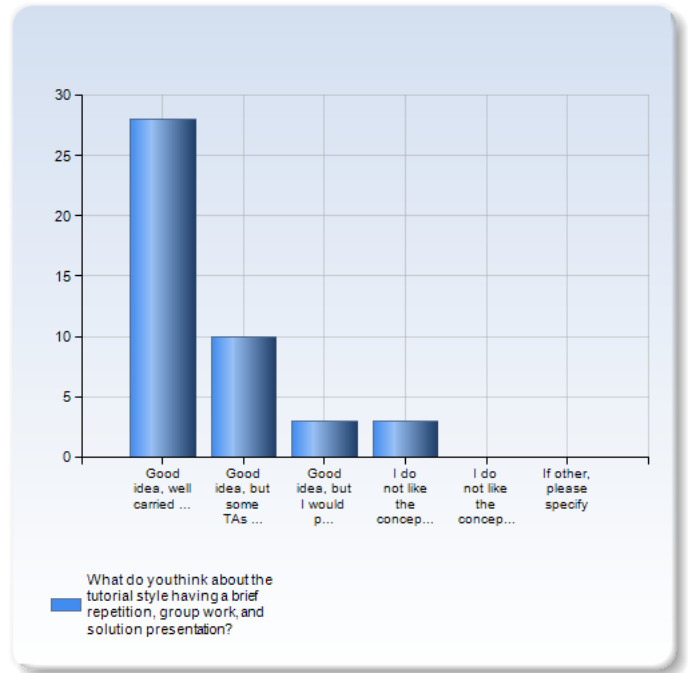
How many tutorials did you miss?

How many tutorials did you miss?	Number of Responses
0	0 (0.0%)
1	9 (42.9%)
2	8 (38.1%)
3	2 (9.5%)
4	1 (4.8%)
5	0 (0.0%)
6	0 (0.0%)
7	0 (0.0%)
8	0 (0.0%)
9	0 (0.0%)
10	0 (0.0%)
11	1 (4.8%)
12	0 (0.0%)
Total	21 (100.0%)



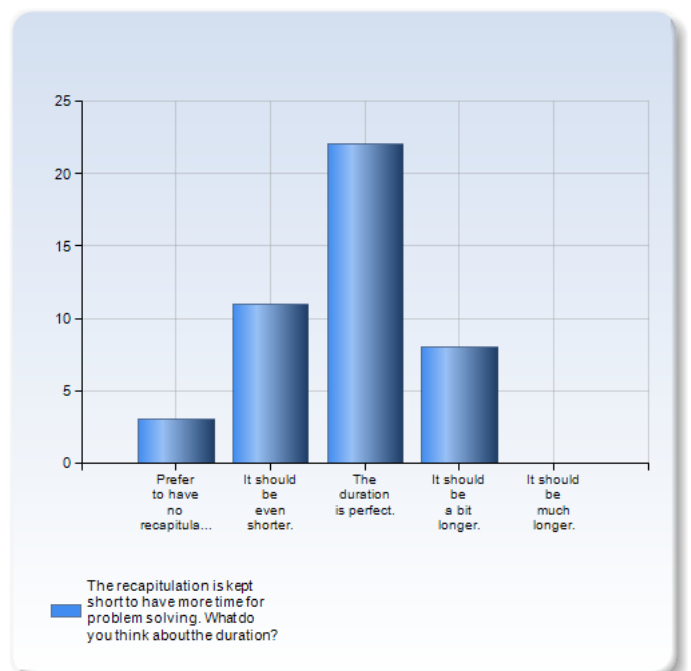
What do you think about the tutorial style having a brief repetition, group work, and solution presentation?

What do you think about the tutorial style having a brief repetition, group work, and solution presentation?	Number of Responses
Good idea, well carried out by the TAs.	28 (63.6%)
Good idea, but some TAs did not follow the concept.	10 (22.7%)
Good idea, but I would prefer to work alone.	3 (6.8%)
I do not like the concept and prefer solution presentation only.	3 (6.8%)
I do not like the concept and prefer group work only.	0 (0.0%)
If other, please specify	0 (0.0%)
Total	44 (100.0%)



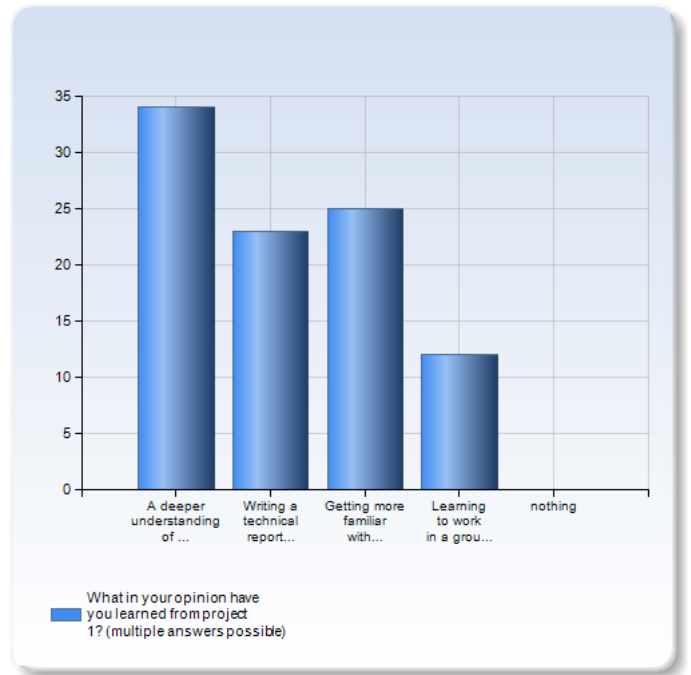
The recapitulation is kept short to have more time for problem solving. What do you think about the duration?

The recapitulation is kept short to have more time for problem solving. What do you think about the duration?	Number of Responses
Prefer to have no recapitulation.	3 (6.8%)
It should be even shorter.	11 (25.0%)
The duration is perfect.	22 (50.0%)
It should be a bit longer.	8 (18.2%)
It should be much longer.	0 (0.0%)
Total	44 (100.0%)



What in your opinion have you learned from project 1? (multiple answers possible)

What in your opinion have you learned from project 1? (multiple answers possible)	Number of Responses
A deeper understanding of the course material.	34 (77.3%)
Writing a technical report.	23 (52.3%)
Getting more familiar with Matlab.	25 (56.8%)
Learning to work in a group.	12 (27.3%)
nothing	0 (0.0%)
Total	94 (213.6%)



Please feel free to add a comment.

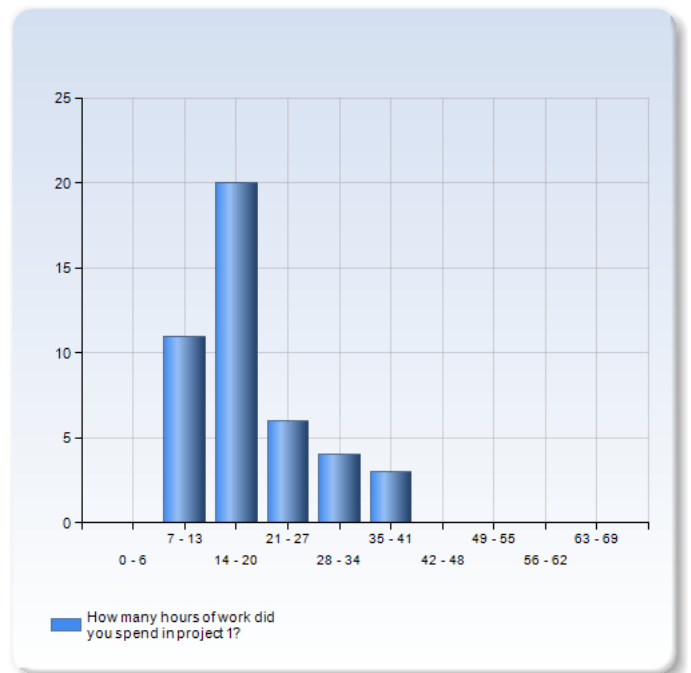
Project one is not that difficult, and very suitable for us to get started.

I believe most students required to take this course already have experience using MATLAB, writing reports, and doing group work.

The project 1 was very described, so it has given a good understanding of the course material.

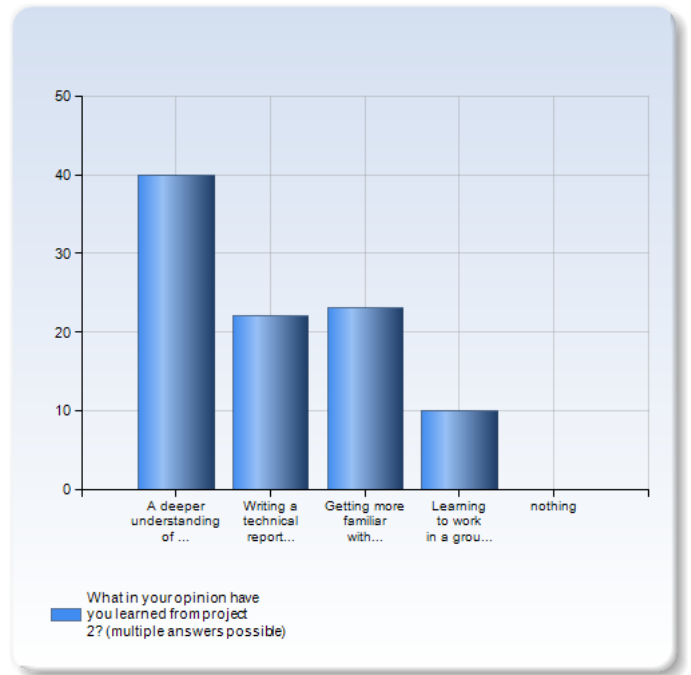
How many hours of work did you spend in project 1?

How many hours of work did you spend in project 1?	Number of Responses
0 - 6	0 (0.0%)
7 - 13	11 (25.0%)
14 - 20	20 (45.5%)
21 - 27	6 (13.6%)
28 - 34	4 (9.1%)
35 - 41	3 (6.8%)
42 - 48	0 (0.0%)
49 - 55	0 (0.0%)
56 - 62	0 (0.0%)
63 - 69	0 (0.0%)
Total	44 (100.0%)



What in your opinion have you learned from project 2? (multiple answers possible)

What in your opinion have you learned from project 2? (multiple answers possible)	Number of Responses
A deeper understanding of the course material.	40 (90.9%)
Writing a technical report.	22 (50.0%)
Getting more familiar with Matlab.	23 (52.3%)
Learning to work in a group.	10 (22.7%)
nothing	0 (0.0%)
Total	95 (215.9%)



Please feel free to add a comment.

The second project was more fun than the first one. But it was harder. It took a lot of time until I fully understood how to solve the problem.

I actually have learned about wiener filtering before, but I never really understood what was the derivatives behind the conclusion. During the project 2, I took lots of time doing the derivatives again by myself and had a better understanding about wiener filtering.

We spent a long time on project 2, and get better understanding on designing a filter.

I like it. Putting theories to practical use gives a better understanding.

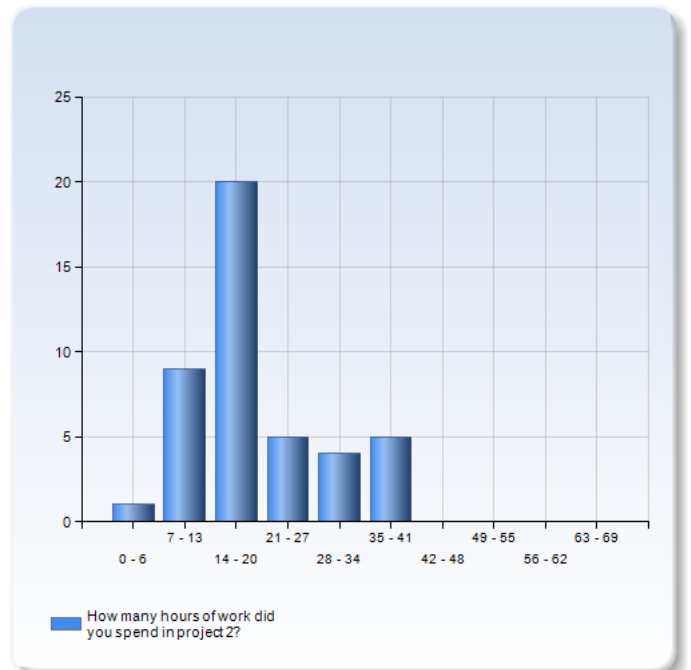
I think project 2 is very interesting.

Project two had a funner presentation than project one and was more pleasant to complete because of it.

We have less Matlab in project 2, because it was more focus on find the correct solution. It was less detailed than the project 1, and therefore I have learned also how to really solve a problem from the beginning to the end.

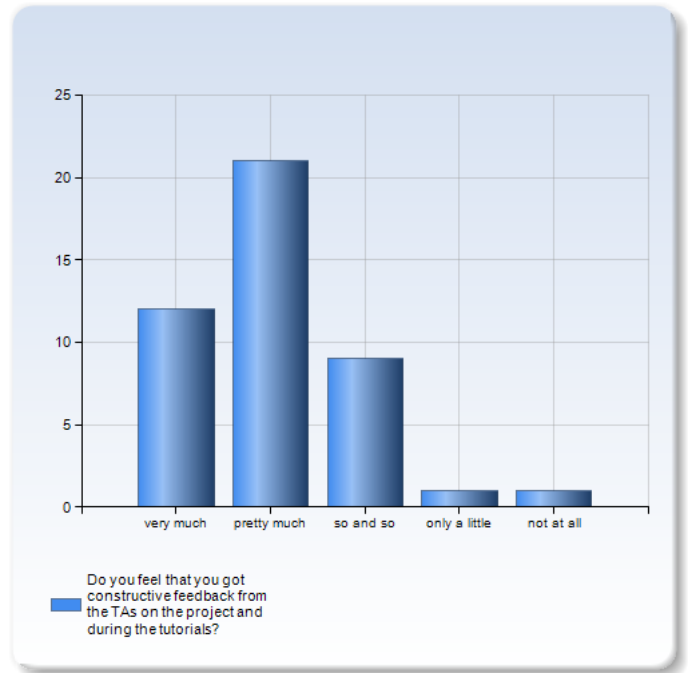
How many hours of work did you spend in project 2?

How many hours of work did you spend in project 2?	Number of Responses
0 - 6	1 (2.3%)
7 - 13	9 (20.5%)
14 - 20	20 (45.5%)
21 - 27	5 (11.4%)
28 - 34	4 (9.1%)
35 - 41	5 (11.4%)
42 - 48	0 (0.0%)
49 - 55	0 (0.0%)
56 - 62	0 (0.0%)
63 - 69	0 (0.0%)
Total	44 (100.0%)



Do you feel that you got constructive feedback from the TAs on the project and during the tutorials?

Do you feel that you got constructive feedback from the TAs on the project and during the tutorials?	Number of Responses
very much	12 (27.3%)
pretty much	21 (47.7%)
so and so	9 (20.5%)
only a little	1 (2.3%)
not at all	1 (2.3%)
Total	44 (100.0%)



Please feel free to add a comment.

Awkward question. For the project we pass at the first time so we don't know. For the tutorials, they answer question well but "feedback" will not be the word.

Marie really did a great job!

I am really grateful to TA's work. However, actually the handwriting from them is a little too hard to be recognized. Maybe in the future this process can be online (through Canvas). Then it will be much more convenient.

It would be nice to set a session for each of the project assignment where we could ask our questions to the TAs, because we didn't have time during the tutorials since everybody was focused on the exercises.

About the tutorials, once again depending on which TA, yes totally or no not really.

we had the answers display in front of us but they didn't really say what we could improve in our own derivations but that's probably too personal to give to everyone...

During the tutorials, they are great, however the comments on the project not so much

The feedback on the reports was generally pretty useful though sometimes, seemed a bit unnecessarily picky.

The comments on the projects could have been more detailed but I guess the TA's didn't want to give to much information about the solutions.

Marie is very helpful and have a great knowledge of the course.

It depends on the TA

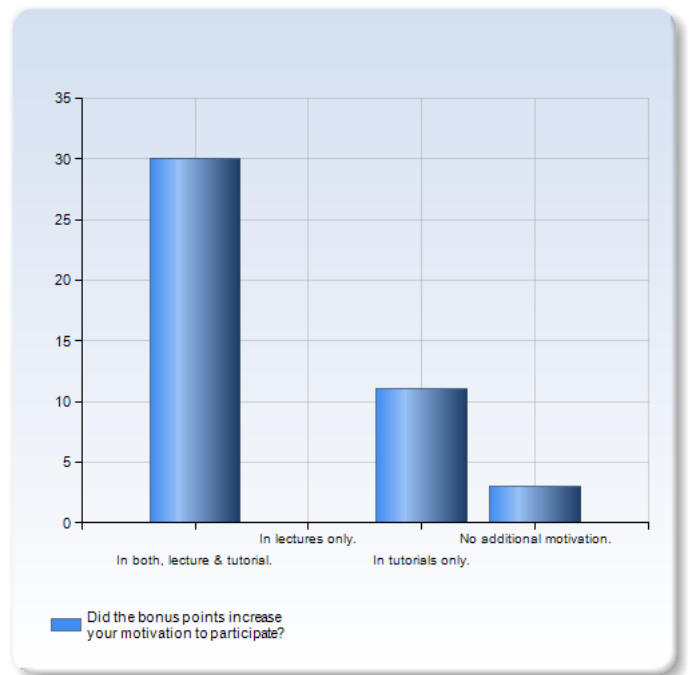
But only one thing is hard for me: the TAs' handwriting comments.

Maybe print is better.

Every time we asked something on the project, they didn't respond clearly like they didn't know the subject. They didn't want to talk about the project during the tutorials, and they didn't give answer on Canvas.

Did the bonus points increase your motivation to participate?

Did the bonus points increase your motivation to participate?	Number of Responses
In both, lecture & tutorial.	30 (68.2%)
In lectures only.	0 (0.0%)
In tutorials only.	11 (25.0%)
No additional motivation.	3 (6.8%)
Total	44 (100.0%)



Please feel free to add a comment.

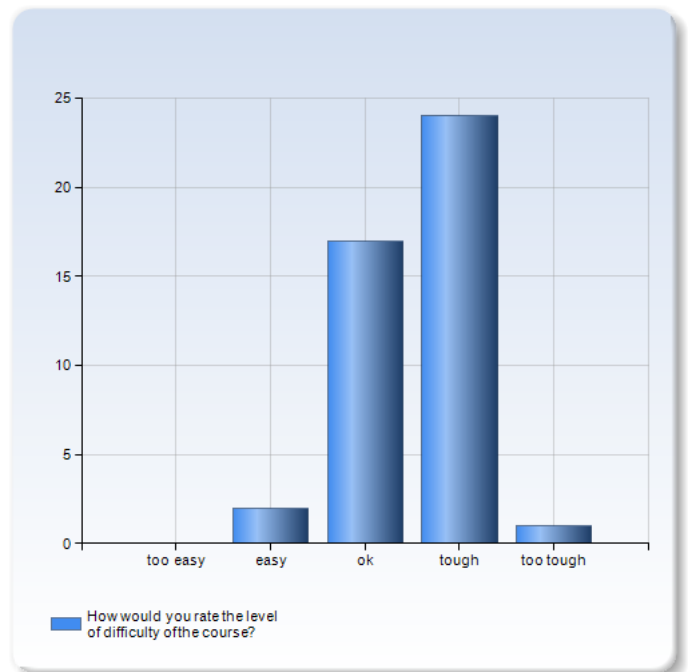
As said before, the idea of having a part A for exams overwhelms students. is not a good idea and not fair. If these bonus points were, extra points on my final grade I would be much more interested and motivated

Yes of course, very good concept to motivate the student!!!

Even if I would attend the tutorials without the bonus point, it's motivate me to come at 8am. However, it didn't motivate me to come to the lectures because, to get bonus point, we just have to give back the reflective question. We can do that by different way than to come to the lectures (give during tutorials, just come at the end of the lecture, give to a friend...)

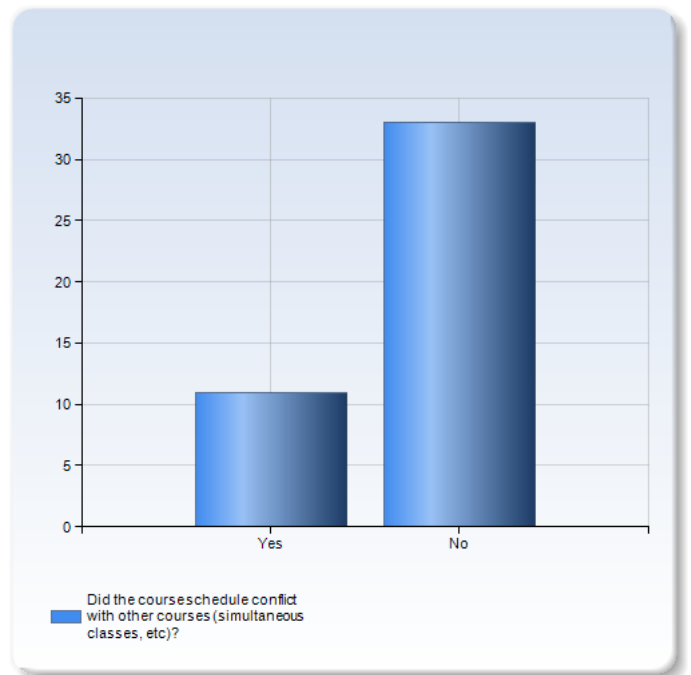
How would you rate the level of difficulty of the course?

How would you rate the level of difficulty of the course?	Number of Responses
too easy	0 (0.0%)
easy	2 (4.5%)
ok	17 (38.6%)
tough	24 (54.5%)
too tough	1 (2.3%)
Total	44 (100.0%)



Did the course schedule conflict with other courses (simultaneous classes, etc)?

Did the course schedule conflict with other courses (simultaneous classes, etc)?	Number of Responses
Yes	11 (25.0%)
No	33 (75.0%)
Total	44 (100.0%)



If yes, please provide the name of course (course code) and the frequency of collision.

DD1334 Database Technology

DD2380 Artificial Intelligence

Embedded System

embedded systems, at least once a week (2hours), sometimes twice

This is the only course of mine that is usually in the morning. Sometimes it's difficult to get up.

Internetworking (the other mandatory course for master students of the Information and Network Engineering program). There were some conflicts when I had the laboratory session.

Once or twice with DD1334 Database Technology

Once a week for the thursday afternoon lesson with with EJ2201, but it was no big issue

We almost had issues with labs in another course conflicting with lectures but it was resolved in the other course.

Everytime I had to attend this course to get the bonus points. I have 1 or 2 other lectures at the same time, but this is because I'm an erasmus student.

I missed one tutorial when i had to do an lab in Internetworking (EP2120).

How can the course be improved?

How can the course be improved?

Be sure to separate tutorials between each TA's more equally (per students), because actually This year one was significantly more competent for "teaching part" than the other...

Removal of part A from the exam and put these tasks as extra points towards the final grade

Sometimes there are too many derivations. Maybe more practical examples.

It is already pretty good to me

less proof in lectures

Be more enthusiasm with the lecture .

slow down the procedure of tutorial

Maybe easier final exam because I heard the exam last year was extremely tough and lots of students got failed.....I really hope this year the exam could be much more friendly.

Set the homework to be compulsory maybe. Then I will be pushed to do more exercises.

The speed is a bit quicker!

Stop using reflective questions to prepare students before the class, start using quizzes to make people understand the material and make the quizzes mandatory 2-3 days after the lecture related to the quiz, select TAs that are engaged and motivated to do the tutorials.

Writing reflection before class+ quizzes after class (both getting bonus points in random orders)

Reducing duration of the derivations on the board and maybe ask question during it like "do you understand why that step works", to take everybody's attention. Put both TAs on the same room and make Marie do the brief recap, or I don't know but eliminate this huge difference between the two rooms.

Perhaps there can be more participation from students during lecture hours.

Do not use slides!

If the professor can explain the calculation process for us, it would be better

It's OK.

By giving basic knowledge of concepts since students come from different backgrounds, some even after working for couple of years so the academic touch isn't there. So fundamental knowledge can be provided so that the future classes can be comprehensible.

Maybe some complicated derivation are not time-worthy.

Get rid of the reflective questions, allow longer project reports and give them a sense (It's difficult to do an introduction when there is no goal....)

I think all is ok !

give students more chances to participate in the class

Maybe the first project could have an interesting background story like the second one, because it's quiet motivating

I think if TAs can spend more time on tell us the ideas of solving a specific problem, it would be better for me to understand. What's more, I think the reflective questions can be replaced by online quizzes, maybe quizzes will be easier for us to get the important knowledge points.

Written lectures with more visual examples and explanations of application. Utilizing Marie more, especially for teaching and explanations.

It's good enough.

The lectures can be made more involving for students. Also sometimes, it was hard to follow the writings on board as board was obstructed or moved so it was not always visible.

The schedule of tutorial classes should keep pace with the lectures.

A bit more active professor and another TA, but otherwise it's great.

I really hope professor Tobias can make a clearer and full handwriting on the blackboard, because sometimes I could not recognize the words or symbols especially when his pen was almost out of ink. And I feel the time was not enough for us to complete all exercises during each tutorial, so maybe you can make a better plan about it.

I think the courses should base more on project, and the exams can be more about signal theory and method but not mathematics. I found it may be so difficult in mathematics

It would be better to match the process of the lectures with the tutorials.

Maybe add a general summary after every chapters and add a review class after all lectures

Giving more project hints

More explication on the board, rather than just followed the slides.

Please feel free to add any other comment:

Please feel free to add any other comment:

In summary, this course is really well organized and the teacher is really good.

All in all very good course and staff. Very interesting content. Only think to improve is the consideration of part A in the exam

I really enjoyed the course. The bonus point system is a good concept and the group work during tutorials is a nice idea. The TA's were great. The projects were fun but sometimes a little bit stressful, when you had to do a lot of other things for other courses.

The lecture is helpless

lecturer is handsome

No more suggestions. I really had a wonderful time with this course during my first period. I found it really interesting. Thank you so much for all your help.

nothing

I feel this feedback is very useful for students to give their opinion.

Thanks for teaching, Sir.

very pleasant, little challenging and useful course!

In the reading assignment, you can set a few questions instead of just concepts

The schedule of tutorial classes is faster than lectures sometimes.

It is very nice that the professor and TAs have shown me many useful learning methods, but I feel the pace of the course is a bit quick.

It is helpful to add some learning materials about Matlab on canvas.