Course Analysis for "Deep Learning, Advanced" (6 HP) HT22
DD2412/FDD3412

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Forms of Assessment

The course contains two examination components
- **LAB1:** which consists of implementation practicals as well as quizzes on the different topics of the course, the assignments are individual and are graded in P/F/Fx
- **TEN1:** which corresponds to a final implementation project, in a group of 3 for master students (DD2412) and 1-3 for doctoral students (FDD3412). The projects are graded in A-F/Fx.

Participation and Graduation Statistics

Number of registered 2nd-cycle students (DD2412): 75
Number of registered 3rd-cycle students (FDD3412): 11
Number and rate of graduated 2nd-cycle students (DD2412): 66 (**88%**)
Number and rate of graduated 3rd-cycle students (FDD3412): 9 (**82%**)
Grades distribution for passing 2nd-cycle students (DD2412): **A**(33, **44%**), **B**(11, **15%**), **C**(13, **17%**), **D**(7, **9%**), **E**(0, **0%**)

Summary of course evaluation

Course evaluation format: 22 Standard LEQ Statement Questionnaire
Participation rate: 36% (25 responded out of 70 invited)
Course load on the students: Figure 1 shows the distribution of the course load in week/hours.
General evaluation: As can be seen in Figure 2, in general, students agree with all the 22 LEQ statements with varying degrees from weak agreement (2 statements got rounded average of 4 and 6 statements got rounded average of 5) to moderate (14 statements got rounded average of 6). Comparing Figure 2 (HT21) with Figure 4 (HT22), it can be concluded that the general perception of the course has degraded from last year.
Diversity: The general trend is the same across various subpopulations, that is, the average of all questions clearly and consistently lean on the positive side. There still seems to be a significant difference between international and domestic students' responses as well where the agreement of international students is higher in 19 out of 22 LEQ statements (16/22 from HT 21).
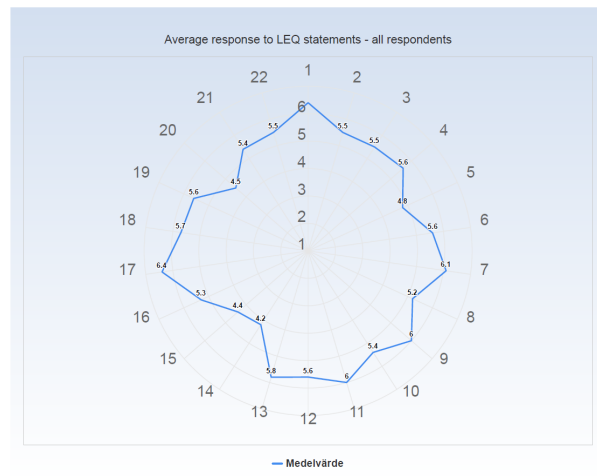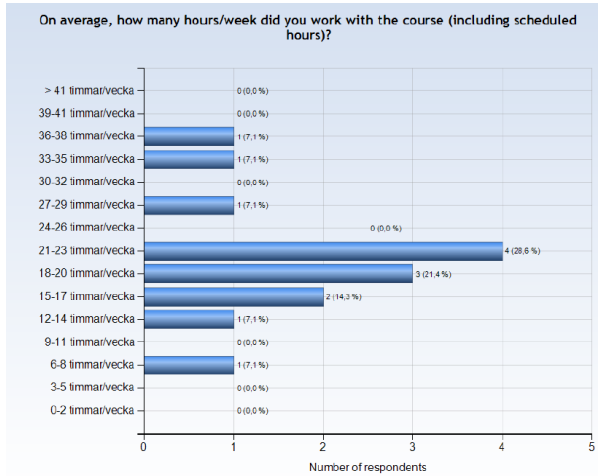
Important Figures

Figure 1: coursework statistics per week **(HT22)**

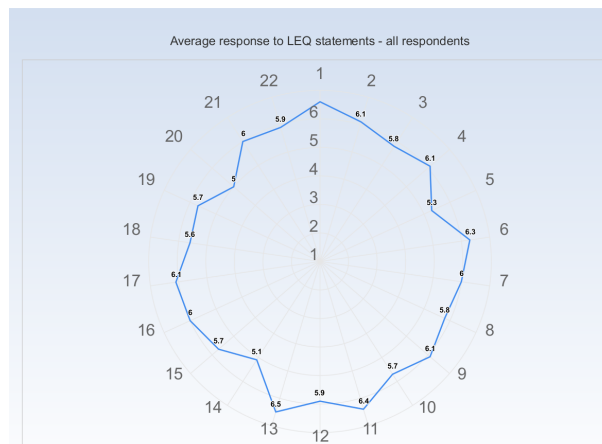

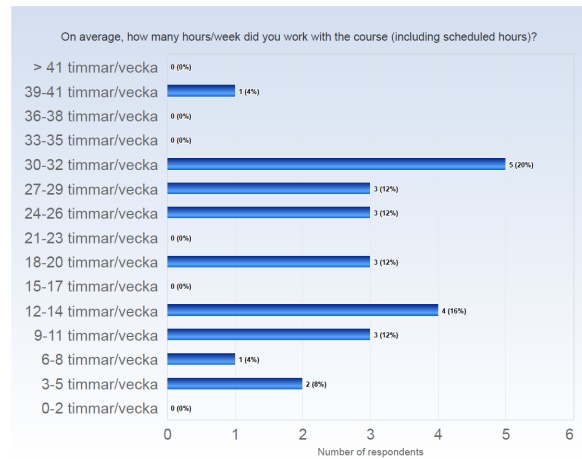Figure 2: average agreement level for LEQ statements **(HT22)**

Figure 3: coursework statistics per week **(HT21)**

Figure 4: average agreement level for LEQ statements **(HT21)**

Course Analysis

Course load for students: While the spread of the course load among students is still relatively large, the average is about 18-20 hours (Figure 1). This is consistent with the workload required for a 6HP course *running over 1 period*. This is similar to the average of last year (average 16 hours, Figure 3). The course responsible still suspects that the students have reported the time mostly based on the P1 experience which is more dense. It should be noted that the large spread is also expected as this is an advanced course and requires different levels of preparation depending on the suitability of the participating students' backgrounds.

Notable positive points: The observations of what aspects have worked better than other aspects is quite similar to the last year: in general, the students were quite satisfied with the content and format of the course. They mentioned that they "worked with interesting issues" 24/25 agreed with this mostly (16/25) at the strongest level), they also mentioned "Very interesting topics" and "the learning material" as the best aspects of the course, they liked the atmosphere of the course and strongly agreed (no disagreement in 25 respondents) that "The atmosphere on the course was open and inclusive". Importantly, the students found the expectation of what should be learnt in the course was clear (only 1/25 disagreed) where they also agreed (2/25 disagreed) that understanding the key concepts of the course had high priority. Furthermore, similar to the previous years, in the free-text section many students considered the following aspects of the course stand out: 1) the lectures' content that is cutting edge methods, a combination of theory and practice, and therefore exciting for the students to engage, 2) the project that was good for practicing their knowledge, fun, relevant, and open to choose its topic, and 3) the implementation practicals, (4) some mentioned the flipped classroom, the flexibility and variation of activities and assignments.

Notable points of improvements:
- "receiving regular feedback from teachers" received 10/25 disagreement, 2/25 neutral, and 13/25 agreement. While more students agreed to the statement, there is a clear room for improvement. Feedbacks from TAs were essentially considered too late in the first period of the course.
- "the opportunity to influence course activities" received 7/25 disagreement, 4/25 neutral, and 14/25 agreement. There were discussion sessions where students were essentially given the chance to directly shape the content. It is not clear what can be done to increase influence.
- "a feel of togetherness" received 5/25 disagreement, 6/25 neutral, and 14/25 agreement. while still most students agreed on this, the number of disagreement and neutrals is meaningfully different from the other questions which makes the room for improvement.
- "Design of the course to support learning" received 5/25 disagreement, 3/25 neutral, and 17/25 agreement. While even more students agreed on this, there seems to be some backlash from the new flipped classroom design.
- Furthermore, in the free-text section students considered the following aspects of the course as point of improvements: (i) for practicals: faster release, better instructions, more help, more detailed grading and bonus criteria, and earlier feedback (ii) more in-person classes (iii) more credits for the course

Teacher's view

The students' view in general has a clearly positive tone, similar to last year but with some degradation despite the improvements in rating that was observed last year (from HT20 to HT21). The teacher believes this is mostly due to the flipped classroom idea that only started in HT22 and put more work on students to understand the concepts. This has been shown in research to reduce the popularity of the course while increasing their grades. Also it seems the general attitude is quite positive where the respondents give a high number of agreement to all questions but the level of agreement has reduced.

The course, this year, have gone through drastic changes in design (flipped classroom) and the addition of mandatory implementation practical.

The developments that were made so far.
- Nine implementation practicals on all topics of the course were developed to help students individually practice the learnt cutting-edge concepts in a hands-on experience setup. This is three more practicals than was planned to increase the spectrum of covered topics.The corresponding KTH repositories can be found here: https://gits-15.sys.kth.se/orgs/dd2412-deep-learning-advanced/repositories
- All lectures were given as video lectures. While large parts of the topics were made specifically for the purpose of video lectures with a higher quality and without an audience, for the rest of the topics recorded online lectures for online audience from other talks and course rounds were used instead.
- As a result of such effort, the in-person lectures were turned into a discussion session.

The changes that remain to be done.
- Turn the rest of the video lectures into videos that are recorded without an audience.
- Create online lecture notes to accompany the video lectures to enable a richer at-home learning experience for the students.
- Make a tutorial on the prerequisites for completing the implementation practicals, e.g., the deep learning framework JAX
- Make the video lectures interactive such that
  - Formative short quizzes can be taken in the middle of videos.
  - Comments or questions can be entered spontaneously by the students while watching to be covered at in-person discussion meetings with students.
- Blend the implementation practicals inside the online lecture notes.

The takeaways from HT22 course offering.
- Providing such a range of varied implementation practicals meant significantly more efforts are required from the teachers to help both in designated help sessions but also on an individual and asynchronous basis. Therefore, we will create a prerequisite tutorial for the next year to reduce the need of teacher's time at least on the programming language JAX.

- For the in-person discussion sessions, sending questions and comments were optional on the students side. This created a situation in which only a subset of the students submitted questions and comments. There should be some mechanism in place to encourage most students to put a comment/question to be discussed.
- While the discussion sessions were active and usually took over the designated time, the discussions were dominated by roughly 15-20% of the students. This might be a result of the previous point but nevertheless needs some adjustment.
- The shorter but more video lectures were clearly preferred over fewer longer ones. More videos should be broken down to smaller self-contained parts.
- The help sessions should be organized better as with the new setup, it seems, students are drastically more eager to seek help from the teachers. This is probably a good sign towards achieving the ILOs but at the same time requires better logistics, planning, and availability of teaching resources.

Planned Measures for the next round

- See above

Proposal regarding potential changes to the course

- The opinion is even futthereinforced that the course should become a 9-credit course
- It should be graded as P/F or 3-scale grading since it is mainly a project course with open-ended objectives