

# Report - IL2233 - 2022-06-23

Respondents: 1  
Answer Count: 1  
Answer Frequency: 100.00%

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Please note that there is only one respondent to this form: the person that performs the course analysis.

**Course analysis carried out by (name, e-mail):**

zhonghai@kth.se

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## DESCRIPTION OF THE COURSE EVALUATION PROCESS

**Describe the course evaluation process. Describe how all students have been given the possibility to give their opinions on the course. Describe how aspects regarding gender, and disabled students are investigated.**

Course evaluation is a continuous process throughout the execution of the course. I continuously ask for feedback from students during lecture intervals, right after lectures, during seminars, etc. Regarding gender balance, I ask both female and male students for feedback and invite both female and male students to join the course meetings.

The course evaluation survey was sent out to all students on 2022-06-06 and finished on 2022-06-21. Students got plenty of time to answer. I also sent three reminders to students in order to increase the answer ratio. The answer rate is 15/22, i.e., 68%.

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## DESCRIPTION OF MEETINGS WITH STUDENTS

**Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)**

Two course meetings were arranged with student representatives and TAs. One is during the course execution on Wednesday, May 4, 2022, and the other on Wednesday, June 22, 2022, after the course evaluation survey finishes. Student representatives include both male and female students.

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## COURSE DESIGN

**Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.**

This is a completely new course and the first offering of the course. The course is developed mainly for the students in the embedded systems master program, particularly for those in the embedded software track and embedded control track.

The course consists of 10 lectures, 3 labs, 2 seminars, and 1 project. Labs and seminars were performed in groups, 2 students per lab group, 3 students per seminar group. We tried two different grouping schemes. The lab grouping is self-organization (i.e. finding own partner to work with). The seminar grouping is a random assignment so that students can work with other students, too. In seminars, the students present research papers per group. The project is an individual work to ensure that all students have gained sufficient knowledge, skills, and understanding of the essential course content after completing the course.

The examination includes lab, seminar, and project. To encourage deeper self-investigation on interesting topics without worrying about grades, the course uses simple Pass/Fail grading.

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## THE STUDENTS' WORKLOAD

**Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If there is a significant deviation from the expected, what can be the reason?**

The course was offered in Period 4, Spring term (VT 2022). The learning period spans over 10 weeks, with 50% of the learning pace. The nominal workload is 20 study hours per week. In total, it is 200 study hours, worth of 7.5 ECTS credits.

According to the student survey, the average number of study hours (estimated workload) is about 18 hours per week. Some students spent a bit more time and some a bit less. Two students spent 30 to 32 hours on the course ("mostly due to labs"). Overall, the course workload can be considered reasonable. (A small note: One student out of the 15 respondents wrote their study hours as 6-8 hours per week. This might be an underestimate, perhaps due to excluding the scheduled study hours.)

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## THE STUDENTS' RESULTS

**How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?**

The students have performed well in the course. All labs were completed in time. Most seminar presentations had high quality. In the final project workshop, students presented their project results in time and with good quality in general.

The examination has 3 parts: lab (group work, 2 students/group), seminar (group work, 3 students/group), and project (individual work). The grading is Pass or Fail. Two students did not present at the project workshop and submit the final project report (one student was sick). The other 20 students have passed the examination.

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## STUDENTS' ANSWERS TO OPEN QUESTIONS

### What does students say in response to the open questions?

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What was the best aspect of the course? (I worked: 6-8 timmar/vecka)

\* lab

What was the best aspect of the course? (I worked: 9-11 timmar/vecka)

\* Both the final project and seminars left a deep impression on me, I think that is the best part, they are interesting and challenging

What was the best aspect of the course? (I worked: 15-17 timmar/vecka)

\* The fact that it was more practical rather than theoretical.

\* This course introduced me to different ways of dealing with time series by solving realistic problems. Good combination of theory and practice.

\* We have sufficient lab practice to try to apply what we learned.

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)

\* Students can learn in different ways by doing labs, seminars and project.

\* The labs are good. It fits the course well, and the lab manuals are well written.

\* The pace of the course was good in terms of the seminars and first two labs, it matched up good with the lectures.

What was the best aspect of the course? (I worked: 21-23 timmar/vecka)

\* labs

\* Implementation of the SOM algorithm in C++ was really an interesting work and helps understanding the key concepts.

What was the best aspect of the course? (I worked: 30-32 timmar/vecka)

\* The seminar session and the final project.

\* Lab 3, but also the hardest

What would you suggest to improve? (I worked: 6-8 timmar/vecka)

\* shorten the seminars

What would you suggest to improve? (I worked: 9-11 timmar/vecka)

\* The final project needs too much time spent on it.

What would you suggest to improve? (I worked: 15-17 timmar/vecka)

\* Balance more the labs.

\* Not all students have both python and C++ development experience. For lab, we can give a simple skeleton to speed up the newbie's familiarity.

\* Perhaps a better schedule. The time between lab3 and project is too short. Split project to several check points.

What would you suggest to improve? (I worked: 18-20 timmar/vecka)

\* Hope to open a discussion session for grouping...

\* Although the project is challenging, if the project can be set to solve a problem using the method we learn in the course with a group may be interesting too. For example, give students some potential topic selection, and chose a method such as deep learning and clustering to finish the job.

\* The last lab really took a huge amount of time, time not spent actually learning any of the course concept, but instead just trudging C until it worked.

What would you suggest to improve? (I worked: 21-23 timmar/vecka)

\* some of the lab contents are repetitive.

\* It was a pity that the RNN and LSTM algorithms were taught and exercised only with in a high level. When I was using these algorithms in python, I felt I was just using a black box. I could not really "touch" the core mechanism of RNN or LSTM.

What would you suggest to improve? (I worked: 30-32 timmar/vecka)

\* The schedule of help session, which should be set a few days before the lab session.

\* A bit more guidance in the final project

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## SUMMARY OF STUDENTS' OPINIONS

### Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

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Students were satisfied with the course as we can see from the course evaluation survey. In the course meetings, students were also very positive about the course. Along with the responses to the 12 statements, all students' responses to the open questions are listed in the course analysis. We see very positive responses and they appreciate the course. Just listen to what they wrote: "Students can learn in different ways by doing labs, seminars and project." "The pace of the course was good in terms of the seminars and first two labs, it matched up good with the lectures." "This course introduced me to different ways of dealing with time series by solving realistic problems. Good combination of theory and practice." "We have sufficient lab practice to try to apply what we learned." "Both the final project and seminars left a deep impression on me, I think that is the best part, they are interesting and challenging".

The students have given some suggestions about the project, labs, workload balance, and some students want more help etc. Since the course has students with different backgrounds, some students encountered some difficulties in lab tasks and project, and might spend more time in one lab than another lab. This is a natural problem. We will give more help and guidance to students in future course offerings.

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## OVERALL IMPRESSION

### Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.

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I feel that this first course offering was very successful. The course contents were interesting and stimulating. The labs were well designed and many students were enthusiastic about the tasks. The seminars allowed students to access the latest research papers and touched upon recent developments in this hot area. The project gave students a wide and holistic view about the key course content and their relationships. While the labs and seminars were group works, the project was an individual assignment to ensure that the learning outcomes were achieved per participant.

Students enjoyed reading the course, spent good efforts, and achieved good results. Students were very positive about the course. The course evaluation has an average score of 6.24 out of 7.0 on its first offering. This means that the course was running smoothly and the learning experience was very good in the course.

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## ANALYSIS

Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between:

- students identifying as female and male?
- international and national students?
- students with or without disabilities?

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The course evaluation survey has 12 statements, a core subset of the entire 22 statements from the full version of LEQ (Learning Experience Questionnaire). The statements are listed below. The score for each statement is listed in [ ].

The responses to each statement are scored from -3, -2, -1, 0 (neutral), 1, 2, 3, X (no standing), corresponding to score 1 (-3) to 7 (+3). There are no big variations across the answers. The highest score is 6.6, while the lowest is 5.6. The average score is 6.24.

### Stimulating tasks

1. I worked with interesting issues (a) [6.5]

### Challenge

4. The course was challenging in a stimulating way (c) [6]

### Comprehensibility - cognitive level

#### Clear goals and organization

7. The intended learning outcomes helped me to understand what I was expected to achieve (e) [6.1]

#### Understanding of subject matter

10. I was able to learn from concrete examples that I could relate to (g) [6.4]

11. Understanding of key concepts had high priority (h) [6.5]

#### Constructive alignment

12. The course activities helped me to achieve the intended learning outcomes efficiently (i) [6.1]

### Feedback and security

15. I could practice and receive feedback without being graded (j) [5.6]

16. The assessment on the course was fair and honest (k) [6.6]

### Manageability - instrumental level

#### Sufficient background knowledge

17. My background knowledge was sufficient to follow the course (f) [5.8]

### Variation and participation

19. The course activities enabled me to learn in different ways (m) [6.6]

### Collaboration

21. I was able to learn by collaborating and discussing with others (n) [6.6]

### Support

22. I was able to get support if I needed it (c) [6.1]

There are no significant differences in experience between male/female students, international/national students, students with/without disabilities.

Per gender, students commented: "Can't tell any difference." "I think students of all genders can participate equally in the course. "Everything is good."

Per type of student, students commented: "It is Ok." "Everything is good."

Per disability, two students commented: "No comment." "Since I don't have any form of disability, I think I cannot comment from this perspective."

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## PRIORITIZED COURSE DEVELOPMENT

What aspects of the course should be developed primarily? How can these aspects be developed in short and long term?

In the next offering, the following specific points are to be addressed.

(1) The course content will be continuously updated by incorporating the state-of-the-art developments in the field.

(2) The reading paper list will be enhanced.

(3) Arrange a one-hour pre-lab session before each lab to help students prepare the lab. Usually, some students have some questions before running a lab. With a pre-lab session, students have the possibility to ask questions to TAs and get more guidance.

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## OTHER INFORMATION

Is there anything else you would like to add?

It has been a huge amount of work to develop this entirely new course from idea to structure, from topics to all detailed materials. I prepared everything from scratch, lecture slides, lab tasks and manuals, project tasks and descriptions, seminar topics, reading paper list, etc. It took me about 2 to 3 years of continuous thinking and working, daytime and nights, weekends, and holidays. I am very happy to see the successful execution of the course even from the first offering.