

Report - SH2314 - 2022-07-17

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

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):

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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.

After the course, the course participants were encouraged (by e-mail) to fill in a learning experience questionnaire (LEQ) with 12 questions answered with numerical values and a number of free-response questions. Four out of 24 participants answered the LEQ. Due to the small number of respondents to the LEQ, it was not possible to analyze differences based on gender and disability in the answer to the LEQ. However, inclusiveness in general, and gender inclusiveness in particular, was discussed in the course evaluation meeting (see below).

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.)

There were no course evaluation meetings during the course since no student expressed interest in taking part in this at that stage. After the completion of the LEQ, a course evaluation meeting was held (Zoom, 2022-07-13) where the examiner and two course participants participated. (Takers of the PhD course FSH3220, which was co-taught with SH2314, were also invited to take part in the meeting but none of the takers of that course did so.)

COURSE DESIGN

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

SH2314 Medical Imaging Signals and systems (7.5 credits)
Course responsible, teacher and examiner: Mats Persson
Course requirements: Exam (TEN1, 4.5 credits), lab exercises (LAB1; 3 credits)

This course consists of a series of thirteen lectures and one exercise class. The classes are held as a combination of slide shows and blackboard derivations, with different active learning exercises mixed in. These active learning exercises can be anonymous quiz questions, which are subsequently discussed in class and sometimes in small groups. On a few occasions, the students were also asked to perform small group assignments in class, such as identifying an unknown x-ray spectrum or simulating CT imaging in Matlab. (One MRI exercise did not work out as expected due to an online application that crashed.)

To ensure continuous learning, six sets of optional hand-in problems were given throughout the course, giving bonus points on the exam. There was also an opportunity for the students to present on a topic of their interest to get bonus points for the exam (which two students did).

The lab part of the course consisted of two parts: First, a virtual study visit where the students watched online videos showcasing different medical imaging equipment and then took a simple quiz. They were also asked to find a video that they themselves were interested in and post it on a discussion board. Second, there was a lab exercise where the students took a CT scan of a doll and measured an unknown contrast agent concentration. This exercise required numerical programming to analyze the data and was examined with a lab report.

Compared to last year's course, the main difference was that the course this year was given as a hybrid course rather than only on Zoom, due to the different Corona situation compared to last year. Specifically, the course was given in person, but the lectures were also streamed on Zoom. The lab was held in-person. Most students chose to attend in person.

Apart from that, only minor adjustments were made since last year's course evaluation was predominantly positive. The homework was appreciated by the students last year although there was some criticism that it did not provide sufficient knowledge for the exam and that there was sometimes information missing from the lecture notes that was needed for the homework. Based on this feedback, the homework sets were revised somewhat compared to last year, to fix minor errors and omissions and to diversify the range of topics covered. Likewise, the lab instructions were revised for clarity, as suggested by last year's course analysis. Another piece of student feedback from last year was that the office hours were scheduled too far ahead of the homework deadline, and for this reason the office hours were moved to Thursday which is also the last day to hand in the assignments.

Very minor adjustments were done to list of reading assignments to harmonize with CM2020 to some degree (since this course and SH2314 are expected to be taught together starting academic year 2023/2024). However, more work remains to be done if these two courses are to be taught together.

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?

Since this is a 7.5 credit (five full time weeks) course running during one study period the expected number of work hours per week is $5 \cdot 40 / 10 = 20$. Three of the four LEQ respondents reported spending 9-11 hours per week and one student reported 3-5 h/week. This seems to be significantly less than the expected number of hours, but after discussing this with student representatives in the course meeting, I believe that these numbers may have been interpreted by the students as excluding the intensive study period before the exam and therefore being underestimations of the total workload. I therefore do not see a need to increase the workload based on this limited data sample (4 responses out of 24).

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?

Out of 24 students taking the course (originally 25 but one dropped out), 21 took the May 2022 exam. Out of these, 16 (76% of those taking the exam) passed with the following grades: 3 A, 2 B, 3 C, 4 D, 4 E. The grades were therefore more or less evenly distributed. These results are normal, and while the average grade is lower than last year, that may be explained by the larger student population this year (24 attendees instead of 7) with several students coming from a non-physics background. All 24 students have now passed the lab part of the course.

STUDENTS' ANSWERS TO OPEN QUESTIONS

What does students say in response to the open questions?

- * The best aspects of the course appear to be the assignments and the availability of the teacher. Example: "The assignments and practice, besides the professor availability:
- * Suggested improvements are more exercises, better focus on key topics of each modality and "practical parts of the theory" (which I interpret as better connection of the theory with practice).
- * Advice to future course participants: go to the lectures, do the assignments and put in long hours.
- * On the question on whether the course climate was inclusive, the responses indicated that so was the case. Example: "Definitely yes! I would also improve more help between students on topics for example incentivating more to post questions on canvas group so that others could answer or similar"
- * The respondents thought the lab was interesting. However, one respondent indicated that the instructions could be clearer.
- * On the question on the time required for the course compared to other courses, all respondents indicated that it is comparable.

SUMMARY OF STUDENTS' OPINIONS

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

Students' impressions as reported on the LEQ were positive, with no answer getting an average score below 5.8 on a scale from 1-7. The students perceived that they worked with interesting issues, that they had sufficient background knowledge and that the assessment was fair and honest. The student feedback in the course meeting was likewise predominantly positive. Somewhat lower scores on the LEQ were achieved for questions 10 ("I was able to learn from concrete examples that I could relate to"), 15 ("I was able to practice and receive feedback without being graded") and 21 ("I was able to learn by collaborating and discussing with others"). Ways to improve on these aspects were discussed in the course meeting and for questions 10 and 15 the student representatives suggested giving more concrete examples of how linear-systems theory relates to practical situations, spending a bit more time on the key concepts of each imaging modality and starting each lecture with a short ungraded class exercise that students can prepare beforehand. For question 21, a suggestion is to encourage the students to post on the canvas discussion boards and to offer to assign students who want to find someone to work with to study groups of about three people, randomly.

The student representatives mentioned the office hours as a positive thing but suggested that it be moved to at least one day before the weekly hand-in assignment deadline.

An assignment on the exam containing a code snippet that the students were to interpret prompted a comment from one of the student writing the exams, who pointed out that newer calculators can execute python code and that this can give students an unfair advantage. The student representatives agreed that testing programming-related skills on the exam is not necessary and that the lab is sufficient to examine this course goal.

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.

The overall impression of the course is that the current format is working well, and that the feedback from the students is predominantly positive. Since the impression was similarly positive in the previous course round, there have not been any major changes and it appears that the planned future changes should be implemented carefully in order not to spoil the successful aspects of the present course format.

Some of the changes made compared to last year's course seem to need more work. In particular, the lab instructions are still perceived as unclear and may need to be reworked, and more effort needs to be put into aligning the reading list with CM2020 to be able to teach these courses together in the future.

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?

Due to the small number of respondents on the LEQ it is not possible to identify differences in experience between subgroups of students. However, the feedback from the students suggests that the course climate is inclusive. More can be done to improve the inclusiveness for international students by facilitating the forming of study groups. The question of inclusive climate for female students was discussed in the course meeting but no concerns were identified. For this reason, I will assume that there is no need for major changes while nonetheless continuing to look out for ways of improving the course climate.

Not all students attend office hours. In particular, it seems that stronger students are more likely to come to these. It would therefore be desirable to find ways of encouraging the students who need support the most to be more active in this regard.

PRIORITIZED COURSE DEVELOPMENT

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

The course will be given again next spring semester (2023) in a similar format as this year. After that it will be moved to study period 2 and coordinated with CM2020 with which there is a large degree of overlap. It is therefore desirable to align the course with CM2020 to a degree already at the next course offering. One possibility is to record the lectures in SH2314 next course round and make these video lectures available for future participants in SH2314 and CM2020. This will fit in well with the plans to make the classes in SH2314 flipped-classroom sessions to a large extent, in agreement with the planned mode of teaching in CM2020. This idea was received positively by the student representatives in the course meeting but will have to be considered more carefully together with the course responsible for CM2020 before a decision can be made. It is possible that a few minor changes in the covered course content should also be made to be able to make better use of synergy effects with CM2020, e.g. increasing the amount of material on detectors and maybe compressing the linear-systems part slightly.

Apart from that, the course is not expected to undergo any major changes, but in response to the feedback to the students, it is desirable to put in more in-class exercises and help students form study groups if they express interest.