Report - SH2314 - 2023-12-17

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. Six course participants out of 21 (29%) answered the LEQ. Due to the small number of respondents to the LEQ, it was not possible analyze differences based on gender and disability in the answer to the LEQ. However, inclusiveness 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. After the completion of the LEQ, a course evaluation meeting was held (2023-12-08) where the examiner, one course participant and one representative of the Physics Chapter of the student union took part.

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 three lectures, one exercise class and five four-hour workshops. The lectures and exercise class are held as a combination of slide shows and blackboard derivations, with some different active learning exercises mixed in, in particular during the exercise class. These active learning exercises can be anonymous quiz questions, which are subsequently discussed in class. On one occasion the students performed a small computer lab (on MRI) in class.

Before each workshop, the students were assigned reading materials and video lectures, consisting of recordings from last year's lectures. The workshops consisted of either one four-hour session or two two-hour sessions on the same day with a break in between. Each workshop started with a quiz that was solved by the students individually. Following that, the students were allowed to sit together in groups and solve the same quiz problems together. After the students had handed in these, the teacher went through the solutions in a full-class discussion. Then, the students were given a second problem set that they solved in groups during the second half of the workshop. The workshop ended with a full-class discussion of the group problems. The individual quiz, group quiz and group problem set all gave bonus points for the exam. To supplement the topics covered in the workshops, two sets of optional hand-in problems were given throughout the course, giving bonus points on the exam.
The lab part of the course consisted of three labs: "Photon-counting, SNR and the Rose model", "X-ray computed tomography", and "Positron Emission Tomography". A lab on "Single-photon Emission Computed Tomography" was planned as an alternative to the positron emission tomography lab but was cancelled due to unavailability of equipment. These exercises required numerical programming to analyze the data and were examined with a lab report.
The course was given in person at Albanova (except two labs given in Flemingsberg), but in some cases people asked to and were allowed to take part in the workshops over zoom. The students were given the opportunity to interact with the course responsible over Zoom during weekly office hours.

There have been major changes to this course compared to the last round, mandated by the fact that this course was intended to be co-taught with CM2020 (although as it turned out, CM2020 was not taken by anyone this round). The course has now been moved to period 1 and is now taught in the flipped-classroom format outlined above instead of as a regular lecture series, which was the case before. The number of homework assignments was reduced from six to two, and the possibility to hold a presentation for bonus points was removed. These course moments were replaced by workshops, which could give bonus points on the exam. Furthermore, the lab part of the course was changed from one extensive lab and a study visit to three somewhat less extensive labs.
The course content was almost unchanged, however, and the examination format was the same as before.

THE STUDENTS' WORKLOAD

Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these 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 nine weeks the expected number of work hours per week is 5*40/9=22. The students' responses suggest that they work between 6 and 20 h per week, i.e. there is a very large span. Those respondents who give lower estimated hours per week may perhaps be underreporting the number of hours they spent, i.e. by not including studying for the exam in these numbers. I therefore do not see a need to increase the workload based on this quite limited data sample.)

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 21 registered students, the first exam was taken by 19 students. Of these 19, 16 passed the exam. Therefore, of the 21 course attendees, 76% passed the first exam. Of the passing grades, the grade distribution was 4 A, 3 B, 3 C, 4 D and 2 E. These are fairly typical grades, though slightly higher on average than last course round. At the time of writing, all students completed the lab part of the course.

STUDENTS´ANSWERS TO OPEN QUESTIONS
What does students say in response to the open questions?

"What was the best aspect of the course" – here responses varied: The structure of the course, labs, learning about "nuclide medicine", and workshops were mentioned.

"What would you suggest to improve"? – in-person classes, not scheduling the lab in the middle of an exam period, and improving the video lectures were mentioned.
For example: 'To improve some parts of the videos. Sometimes when referring to pictures or equations we could not se what was refered to when you said "we can see here..." Or "this part is ..."'

"What advice would you like to give to future participants?" – attending workshops and studying for the weekly assessments was mentioned.

"Is there anything you would like to add?" – the only answer was "Great course, very happy I took it!"

"What did you think about the "flipped-classroom" format? Would you prefer to have lectures instead of workshops and receive bonus points through more homework sets instead?" – Here responses varied, with some positive and some negative.
For example: "I generally liked the format but some of the videos were not really perfect, could use some editing and polishing. More in-class moments without examination would have been good."

"What did you think of the labs?" The respondents generally liked them but pointed out that the lab groups were too big, that the last lab should be held earlier and that they were long and not so intuitive.
For example: "I enjoyed it, however it might be more efficient to have smallest group (especially for reports) and the last lab should be schedule earlier."

"Did you think the course climate was inclusive towards you and others?" All answers to this were affirmative.

SUMMARY OF STUDENTS' OPINIONS
Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

The students' answers to the numeric questions were generally good (= high numbers). On the scale from 1 to 7, all average scores were above 6 except three: 7. "The intended learning outcomes helped me to understand what I was expected to achieve" (score 5.8.), 15, "I could practice and receive feedback without being graded" (score 5.7) and 17. "My background knowledge was sufficient to follow the course" (score 5.8). Regarding question 15, it was suggested in the course meeting that it would be helpful with a bank of ungraded quiz questions on canvas that students can practice on.

In the course meeting the student representatives brought up the following:
* The workshops are good and appreciated by most. They help the students stay in phase with the course. However, the video lectures can be improved. Derivations can be hard to follow and it's difficult to see what I am pointing at.

* The first two labs were good, but the last lab (the PET lab) was scheduled too late in the course and held in too large groups. Up to four people is good. It is also possible to do the lab in a large group but write reports in smaller groups.

* The workshops and hand-in assignments supplemented each other in a good way. It is good that there are both conceptual questions and more mathematical problems.

* It's good that you can participate over zoom if you are ill but the teacher should not encourage the students to participate remotely.

* It was good that there were two teachers available for questions during many of the workshops.

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 transition to flipped classroom and synchronization with the content of CM2020 seem to have been successful in general, with the students showing good results and high satisfaction. However, the course evaluation has revealed multiple things that could be improved such as the need to improve video lectures and make changes to the PET lab. Provided that such changes are implemented, it appears that it's a good idea to keep the flipped-classroom format in future course rounds.

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?

The number of respondents to the LEQ is too small to distinguish between different groups of students. However, based on the discussion in the course meeting it seems that students from different education background can have different difficulties with the course material. The students coming from a biomedical engineering background are typically already familiar with many of the concepts in medical imaging, which students from a physics background may not be. Physics students, on the other hand, may have an easier time with the mathematical aspects of the course. One aspect that was raised in the course analysis from last year was that international students may have a more difficult time finding someone to work together with. This has not been raised as a concern by the students this year, suggesting that the random assignments of students to groups during the workshops may have served to help students get to know each other, as intended.

PRIORITIZED COURSE DEVELOPMENT
What aspects of the course should be developed primaily? How can these aspects be developed in short and long term?

As it seems that the transition to flipped classroom has been successful, future course development should be focused on further improving this course format. The most prioritized change until next year is to improve the video lectures to make them easier to follow, for example by recording a pointer that guides you to look in the right place. The labs should also be reorganized to decrease the size of the lab groups, and they should be scheduled earlier, ahead of the exam period.