IM2661 – Superconductivity and its applications

Course analysis - autumn 2016

Basic information

The course was given in period 2, autumn 2016, and had 5 active students (two registered as CTFYS, one as TNTEM, one as CELTE and one exchange student). Course responsible was Magnus Andersson. In total, the teacher lead part of the course consisted of 22 h lecturing and 3 h of testing.

Aims

The aim of the course is to give basic knowledge about superconductivity and its applications. The lectures aim at presenting the theory and the applications with a special emphasis on explaining the connections between theory and applications taking an engineering perspective on the subject.

Pedagogic development

The main change this year has been to formally divide the examination into to parts – one part consisting of short test exams (coded KON1) given continuously during the course and another part based on hand-in assignments (INL1) consisting of problem solving and evaluations of two superconducting applications. Another development step this year was to migrate the course content from KTH Social to Canvas and to create three quizzes in Canvas to let the students train their conceptual understanding of the subject.

Quantitative data

5 students were active on the course and all of them participated in the examination. 4 of them passed the examination in the course with the following grades:

B	2 students
C	2 students

Course assessment

The students were asked to answer a short questionnaire before the last short exam in the course (before Christmas). This means that the questionnaire was handed out before the students had finished the application evaluation part of the hand-in assignments.

General conclusions

My general conclusion is that the course works well. This is e.g. manifested in some answers to the first question in the questionnaire about the overall impression of the course. Two student comments on this question was:

"The best one I had (out of 6) during my exchange at KTH. Well structured, well thought, I learned a lot."

"Very good course, I would recommend it."

On the question about the most important things to improve in the course, it was clear that some students would have liked an introduction to BCS theory in the course. This has been my plan from the beginning, but that chapter remains to be written. Other comments for improving were a request for feedback on assignments and more examples in the textbook.

From a learning perspective, the course seems to work well. The shortened LEQ-like assessment on learning factors using a 7-step Likert scale, gave good averages on all measured factors. On a scale were 6 = totally agree, 3 = neutral and 0 = totally disagree, statements on meaningfulness gave 4.4 out of 6, clarity gave 5.0 out of 6, cooperation gave 5.5 out of 6, useful feedback from teacher gave 5.0 out of 6 and the necessity to understand the subject for succeeding in the course gave 4.6 out of 6. Most students stated that they so far had studied in between 60-100 h (question asked before they started with the evaluation of the superconducting applications, which at least would add another 20-30 h). Another aspect is that the students gave very constructive and good advices when asked to give advices to students that are going to take this course in the future. A few examples are:

"Do the assignments in the beginning of the week."

"Bring a bit of background knowledge on electromagnetic fields – but don't be afraid, the course is organized well and good to follow."

Course material

The course material seems relevant for the course. There is, however, a need to write a chapter on BCS theory in the textbook.

Examination

The examination method seems very relevant for this type of course.

Summary for next year's course

It seems as the most important part for next year is to find the time to write an introductory chapter on BCS theory and add it to the course. Another aspect is to change the hand-in method on the problem assignments to a file hand-in in Canvas. In such a way, it would be easier to give written feedback to the students on their hand-in problems.