

SK2759 – Superconductivity and applications, 6.0 credits

Course analysis - autumn 2017

Basic information

The course was given in period 2, autumn 2017, and had 12 active students (four registered as TTFYM, three registered as CTFYS, two as TNTEM and three exchange students). There was also one participating PhD student, who followed the course number SK3759. Course responsible was Magnus Andersson. In total, the teacher lead part of the course consisted of 22 h lecturing and 3 h of testing and had two examination parts:

KON1 (3.0 credits): Three short individual exams during the course

INL1 (3.0 credits): Group assignments based on home hand-in problems (50%) and on evaluations of two suggested superconducting applications (50%).

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. The KON1 part tests the individual knowledge in the course and the INL1 part tests the student's ability to work together in solving problems and their ability to work together to shortly evaluate the feasibility of a suggested application using a broad scope of knowledge and finding all relevant factors to consider in the problem (technical as well as environmental, societal and safety aspects and competing technologies).

Pedagogic development

The administration of the hand-in problems and reports was made in Canvas this year, which made it possible to directly comment on the student's hand-ins so that they received their feedback much faster.

The suggestions for a new chapter on BCS theory in the course book was not implemented this year due to time constraints, since I had to take part in a larger pedagogic development project in another course.

Quantitative data

All students were active on the course and all of them participated in the examination. After complementing tasks for one student, the distribution of final grades was as follows for the whole course (average of grades from the two parts mentioned above):

A	2 students
B	5 students
C	4 students
D	1 student

On the two parts of the examination, the grades were in general higher on the INL1 part than on the KON1 part.

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. All students participated in the course assessment.

General conclusions

The course seems to have worked well and had a positive overall impression. The most appreciated things were the teaching style and the mixture between theory and applications. On the question about the most important things to improve, there were a number of comments that related to what other students considered as the best things with the course. There was only one thing that seemed to stick out a little bit on the negative side, and that was a division between the occasions for the short exams and the lectures. Presently, there has been a half-hour lecture before the exam, but that mixture was not always appreciated and could probably be changed.

Most students state that they have used a reasonable time for the course, although there were a few comments about it taking too much time. In a longer perspective, the course should probably be enlarged to 7.5 credits and involve some more material.

Course material

The course material seems relevant for the course. There is still a need to write a chapter on BCS theory in the textbook. There was also a suggestion for including more about superconducting applications for quantum technology.

Examination

The examination method seems very relevant for this type of course. However, with some more statistics, it seems as the way the INL1 assignments are graded, it is a little bit too easy to get a high grade (grade C was the lowest one on this part). The grading rules of the KON1 part used all grades (and all students passing that part) and seems, hence, to be well formulated.

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.

The grading rules of the INL1 part need probably to be reformulated, since the distribution of grades do not use the whole grading scale.

Introduce a time division between the one-hour short exams and the short half-hour lectures given before the exams. This means that there need to be one more lecture in the schedule for next autumn.