

SK2759 – Superconductivity and applications, 6.0 credits

Course analysis - autumn 2018

Basic information

The course was given in period 2, autumn 2018, and had 10 active students (6 registered as TTFYM and 4 exchange students). 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

A new chapter on the basics of BCS theory was included in the course. The student groups in the group assignments were somewhat larger than previous and students were encouraged to create diverse groups, since that will probably be a clear advantage in the INL1 part of the examination.

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	3 students
C	5 students

The grades on the INL1 part were B for all students and the grades on the KON1 part varied from A to F. One student with grade FX complemented to grade E and the only student with grade F took a re-examination on one the KON1 exams just after the course had ended. Hence, all students have now passed the course.

Course assessment

The students were asked to answer a short questionnaire after the course. 6 students out of 10 participated in the course assessment.

General conclusions

The overall impression of the course is definitely satisfying (4 students marked "Very good" and 2 students marked "Good"). The course book and the organisation of the course was particularly mentioned as positive experiences by the students. Two students asked for some laboratory work or for a lab visit. One student reported that they had had some problems with one of the group members, who had not contributed as much as the others to the common work. This was not reported to me during the course, although there was a mechanism for that – this mechanism could, however, be improved to next year.

Course material

The course material seems highly relevant for the course. There can still be a need to improve on the chapters on BCS theory in the textbook. However, to go further into the details is best done by using second quantization, which all students are not familiar with.

Examination

The examination method seems to be very relevant for this type of course. However, all students got grade B on the INL1 assignments, which seems somewhat too high for a few of them. The grading of INL1 part of the exam should be rethought until next year.

Summary for next year's course

The grading rules of the INL1 part and how the averaging between KON1 and INL1 is done should be reformulated to next year in order to try to get a little bit fairer distribution of grades. As the rules are stated now, students with grade E on KON1 can get an overall grade of C on the whole course (although they have received assistance from other students to reach grade B on the INL1 part).

Add an additional lecture to have more time to cover the new chapter on the BCS theory during the lectures.