



## SK2771 Solid State Physics; Period 1; 2020 Evaluation

Compiled by Srinivasan Anand, course responsible

The course consisted of 32 hours of lectures, 20 hours of problem solving sessions and focused on the first eight chapters of Kittel's book on solid state physics.

The course was managed under CANVAS; all contents were regularly updated.

**Teachers:** Prof. Srinivasan Anand (lectures) ; Dr. Ajith Padyana Ravishankar (tutorials)

**Examiner** –Prof. Srinivasan Anand

### Changes and other relevant information:

The course was conducted in English. All lectures and tutorials were held at the KTH main campus. Due to the Covid situation, special institutional mandates and recommendations implied a hybrid method of teaching – in class room (minimum 50%) and on-line; and new formats for examination. In practice and for better coordination for students travelling to the campus attend other classes, we conducted all sessions in the class room but broadcasted live over zoom. This format was very much appreciated by the students. The final written exam was replaced by three quizzes (conceptual questions) and three sets of home assignments (derivations and problems). The quizzes held during the course were each with max 4 units and of 45 min duration. The home assignments (3 sets, each with 4 units max) posted, appropriately spaced to cover a set of topics, with strict deadlines for submission.

As in previous year, the topics covered the first 8 chapters of Kittel's book; special topics such as low dimensional structures, waves in periodic media, emerging materials, nanomaterials and modern devices were introduced.

GRADE	3 Quizzes (3x4 units; required minimum 4) and 3 Home assignments (3x4 units; required minimum 6)
A	>22-24
B	>19-22
C	>16-19
D	>13-16
E	12-13
FX	>10 < 12

**Course content:** During the course, relevant concepts and formalism in quantum mechanics were reviewed when necessary. The contents of chapters 1-8 were relatively new for a majority of the students, while some were familiar with some basic concepts and terms on crystal structure.

**Course development (Changes from previous year):** There were no major changes from previous year, except for updating the lecture and tutorial content (compendium compiled by Dr. A. P. Ravishankar). Efforts were made for tighter coordination between the lecture topics and tutorials. The tutorial problems were re-designed for home assignments.

**Composition of students:** The student pool was primarily from the nanotechnology masters program. The average attendance was about 80 % and "full" attendance at the quizzes. The student participation was active with discussions, mostly when the lectures were in the class-room.

**Special problems/Difficulties:** Surprisingly, the hybrid format functioned smoothly. Notably, the students attended all the quizzes and turned in home assignments on/before the set deadlines. The only problem was the high work-load resulting from the new examination format. This meant correcting about 90 home assignments (30 students, 3 sets) and 90 quiz answer sheets. The canvas interface for commenting on home assignments worked out fairly well. However, the answers to



quizzes (typically, 4-5 sheets per quiz) had to be manually marked with comments and scanned – to provide feedback to the students individually.

***Specific recommendations for 2021:***

Continue present course format. Continue coordination of SK2771 and SK2758 (course responsible: Magnus Andersson) in terms of topics, exams and flexibility on attendance. Continue to make efforts to make students to reflect on the “obtained” or “expected range” of numerical values of physical quantities with known concepts.

The need to adapt the teaching and examination methods due covid restrictions has also given some useful insights. The evaluation format based on in-course quizzes and home assignments promotes student learning and gives in-time feedback to the teachers. Previously, only quizzes were conducted, allowing the student to secure bonus points for final exam. It is worthwhile to consider a balanced combination of quizzes and home assignments, offering bonus points for final exam. Similarly, implementation of a few time-slots for extra-sessions or for discussions over zoom may be considered.