APHY/PHY 449/549 or ENAS 851- Solid State Physics II - Spring 2016

Meets during reading period!

Time & place: Tue & Thu 1:00pm-2:15pm in Becton 408
Three exams: Tue March 1st 1pm, April 6th 8pm, May 5th 1pm
Instructor: Sohrab Ismail-Beigi, sohrab.ismail-beigi@yale.edu, Becton 307
TF: Steven Touzard, steven.touzard@yale.edu, Becton 415
Office hours: Steven: Tuesdays and Thursdays 7pm-8pm
Sohrab: Wednesdays 8pm-9pm in Becton 307 (Sohrab's office) or by email appointment
Textbooks: Solid State Physics by Ashcroft and Mermin, ISBN 978-0030839931
Introduction to Solid State Physics by Kittel, ISBN 978-0-471-41526-8
Piazza Q&A and discussion website: https://piazza.com/yale/spring2016/aphy449/home
Makeup lectures: Due to unavoidable travel (conferences, etc.), I will miss some regular lecture times. Two makeup lectures are scheduled at 8pm on Tuesday Feb 23 and Tuesday March 8th.

Q&A: Asking questions can remove confusion and help you learn. Questions that start group discussions are more helpful as (i) it becomes clear quickly that you are not the only one with the question, and (ii) different ideas and potential solutions are posed. We will be doing the Q&A on piazza (see website above). Problem sets will be posted on piazza so ask questions about a problem set on that problem set's piazza feed to keep things organized. If possible, please ask your questions on piazza rather than emailing us. It saves time for all, makes the answer available to all, and may turn a question into a useful discussion. You can always post your question anonymously on piazza.

Weekly written problem sets (40% of grade): These are posted online on piazza a week before they are due. They are due by on Fridays at 3pm to our administrative assistant Maria Rao in Becton 401. After this cutoff, the homework is late and will be graded out of a maximum of 50%. Once solutions are posted online in classesv2, the homework is not accepted and counted as a zero grade. At the end of the course, I will drop your lowest problem set grade and average the remaining grades.

Three exams (60% of grade, 20% each): There will be three 75-minute exams of equal weight. The dates are given above. There is no final exam for this course.

Group work: We encourage you to work in groups, a proven and effective way to enhance learning (and it can be more fun). However, the final work that you hand in must be your own: your quizzes and problem sets must be your own work. Blind copying is both dishonest as well as detrimental to your learning: it will inevitably catch up with you during the exams.

Excuses: The **only acceptable excuses** for missed work or exams are written Dean's excuses and the instructor's permission. Remember that it is your job to inform me in a timely way about: your excuse, whether you have a dean's excuse, that you handed in your homework in an unorthodox time and/or place, etc. Please communicate with me so I can help you!

Yale Calendar: Here is the hyperlink for the Yale academic calendar with various deadlines.

Topics: This course is a direct continuation of Solid State I (APHY 448) from the fall term. The overall is to cover the material corresponding to the following chapters in Ashcroft and Mermin:

- Chapters 1-3: review of Drude and Sommerfeld models and their failures
- Review of the essentials of band theory
- Chapter 12: semiclassical electron dynamics
- Chapter 13: semiclassical transport theory within the relaxation time approximation
- Chapter 16: beyond the relaxation time approximation and the Boltzmann equation
- Chapter 17: beyond the independent electron approximation
- Chapter 26: phonons in metals
- Chapter 31-33: magnetism
- Chapter 34: superconductivity