Scope

- Coherent picture for understanding complex properties of solids. Topics include periodic structure of crystal lattice, phonons, electronic properties in framework of energy band theory, basic concepts of quasiparticles and their interactions in solid materials.
- Prerequisite: Quantum Mechanics

Textbook

- Neil W. Ashcroft and N. David Mermin
  Solid State Physics

Supplemental Literature
There are a big variety of textbooks on Solid State Physics. However, most books specialize on selected topics or audience. The following list contains some newer standard text books on Solid State Physics which might be an alternative or valuable addition to Ashcroft and Mermin.

- and others as necessary and appropriate!
Contents and Schedule

- CONTENTS AND SCHEDULE ARE APPROXIMATE!
- They can change on a day-by-day basis to conform to student interest and class dynamics.

Tentative Contents

I. Lattice System
1. Chemical Bond in Solids (IL1)
2. Structure of Solids (IL2, AM4,5,7)
3. Determination of Crystal Structures (IL3, AM6)
4. Phonons (IL4, AM21-24)
5. Thermal Properties (IL5)

II. Electron System
6. Free Electrons in Solids (IL6, AM1-3,8,9)
7. Electronic Band Structures (IL7, AM10-15)
8. Dielectric Properties of Materials (IL11, AM26,27)
9. Semiconductors (IL12, AM28,29)

AM refers to chapters from Ashcroft and Mermin, IL to Ibach and Lüth.

Tentative Schedule

Tentative test schedules and other important dates:

Jan 11: No class.
Feb 10: 1. Test
Mar 15: Spring break
Mar 17: Spring break
Mar 24: 2. Test
May 4: Finals
Course Scoring
Scoring will be divided into three categories:

1. Homework. Homework will count 30 % of the course grade.
   Each week a sheet with problems will be issued and has to be returned a week later
   (except in weeks with interim tests). Tentatively there will be 10 sheets with an ideal
   score of 10 points each.
2. Interim tests. There will be two tests during the semester. Each test will be weighted
   to count 20 % of the course grade, thus the two tests will contribute a total of 40 % of
   the course grade.
3. Final Exam. The final exam will count 30 % of the course grade.

Each test, the final exam and all homework sheets together will be designed to yield 100
points for a perfect score.

News and supplemental information
News and additional course information (like the homework sheets and sometimes solu-
tions) will be posted on the web page core.ecu.edu/phys/dingfelderm. Please check the
web page from time to time.

Office Hours
I encourage everybody to stop by my office whenever you have questions or problems.
Don’t hesitate to do so also outside official office hours.