

Physics 617 Bibliography:

The course text provides a logical and readable introduction to the physics of this subject, and has become a classic. Its disadvantage is a lack of connection to recent developments. For this course I will provide lecture notes and updates to help rectify this, but I strongly recommend that you also obtain a newer text as reference, for example one of the ones denoted by the asterisk (*) below.

(1) General Texts:

Course text: Ashcroft and Mermin, Solid State Physics.

Other recommended books, arranged more or less in order of increasing sophistication:

Rosenberg, The Solid State. Nice introductory book.

Omar, Elementary Solid State Physics. A well-written undergraduate-level text, good all-around introduction to the material.

Kittel, Introduction to Solid State Physics. Now in 8th edition, long history of use as general text. Has been continually updated so that it includes recent developments. I used it for undergraduate course.

Blakemore, Solid State Physics. Readable and interesting treatment, especially strong for principles of semiconductor physics.

Harrison, Solid State Theory, and Electronic Structure and the Properties of Solids. The first is a good complement for this course, see in particular the discussion of bandstructures and symmetry. Second one provides a more chemical perspective. Both are inexpensive in Dover editions.

Kaxiras, Atomic and Electronic Structure of Solids (2003). Was used as course text in the past.

* Ibach and Lüth, Solid State Physics. Somewhat more materials focused; a popular comprehensive text now out in 4th edition. Note, this can be read online through our library.

Ziman, Principles of the Theory of Solids (1972 or 1979). Classic, still excellent overview.

* Mahan, Condensed Matter in a Nutshell. (2010) Terse but quite comprehensive and useful up-to-date material.

* Marder, Condensed Matter Physics. Very comprehensive; used as course text in the past. 2015 updated 2nd edition has many recent examples.

* Snoke, Solid State Physics: Essential Concepts. (2008) Text also includes good coverage of optics, Bose condensation, and related topics.

* Cohen and Louie, Fundamentals of Condensed Matter Physics. (2016). New book looks like it would be a useful complement to many parts of this course.

Jones and March, Theoretical Solid State Physics. A more advanced text set, a two-volume set, not so expensive in Dover paperback.

Callaway, Quantum Theory of the Solid State. Also advanced text.

(2) **A few recommended topical texts and more detailed references:** These trend toward texts providing more advanced or expanded treatment of the physical properties treated in this course.

Yu and Cardona, Fundamentals of Semiconductors. 4th ed. out in 2010; good and up-to date for fundamentals of semiconductor materials physics and electronic properties, also optical properties.

- S. M. Sze, Physics of Semiconductor Devices, classic work on this topic. 3rd ed. out in 2006.
Note that ebook version can be read online through our library. Comprehensive reference for device-related topics.
- Fox, Optical Properties of Solids. Focused introduction may be good complement to this course for those desiring more detail on optical properties.
- Blundell, Magnetism in Condensed Matter. Useful introduction, a good place to get started if you are interested in magnetism.
- Chikazumi, Physics of Ferromagnetism. Monograph with much more detail on this topic.
- Rose-Innes and Rhoderick, Introduction to Superconductivity. Clearly written, classic introduction to superconductivity.
- Tinkham, Introduction to Superconductivity. Good comprehensive introduction and reference. 2nd edition (2004) was considerably updated, including discussion of high temperature superconductors (and it is inexpensive). Note that there are many new developments in superconducting materials and devices, and a number of newer books outlining recent developments these materials.
- Singh & Nordström, Planewaves, Pseudopotentials and the LAPW Method. (2006 2nd ed.) A good place to start if you want a more specific introduction density functional theories as well as specific methods used by computational packages for solids. Note can be read online through TAMU library.
- Martin, Electronic Structure Basic Theory and Practical Methods (2004). More comprehensive description of DFT and related modern theories for computational electronic structures. Also see the new book by Martin, Reining and Ceperley (2016), Interacting Electrons.