
Preface

This textbook had its origin in several courses taught for two decades (1965–1985) at Brown University by one of the authors (JJQ). The original assigned text for the first semester course was the classic “Introduction to Solid State Physics” by C. Kittel. Many topics not covered in that text were included in subsequent semesters because of their importance in research during the 1960s through the 1980s. A number of the topics covered were first introduced in a course on “Many Body Theory of Metals” given by JJQ as a Visiting Lecturer at the University of Pennsylvania in 1961–1962, and later included in a course at Purdue University when he was a Visiting Professor (1964–1965). A sojourn into academic administration in 1984 removed JJQ from teaching for 8 years. On returning to a full time teaching–research professorship at the University of Tennessee, he again offered a 1 year graduate course in Solid State Physics. The course was structured so that the first semester (roughly the first half of the text) introduced all the essential concepts for students who wanted exposure to solid state physics. The first semester could cover topics from the first nine chapters. The second semester covered a selection of more advanced topics for students intending to do research in this field. One of the co-authors (KSY) took this course in Solid State Physics as a PhD student at Brown University. He added to and improved the lecture while teaching the subject at Pusan National University from 1984. The text is a true collaborative effort of the co-authors.

The advanced topics in the second semester are covered briefly, but thoroughly enough to convey the basic physics of each topic. References point the students who want more detail in the right direction. An entirely different set of advanced topics could have been chosen in the place of those in the text. The choice was made primarily because of the research interests of the authors.

In addition to Kittel’s classic *Introduction to Solid State Physics*, 7th edn. (Wiley, New York, 1995), other books that influenced the evolution of this book are: *Methods of Quantum Field Theory in Statistical Physics* ed. by A.A. Abrikosov, L.P. Gorkov, I.E. Dzyaloshinsky (Prentice-Hall, Englewood,

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NJ, 1963); *Solid State Physics* ed. by N.W. Ashcroft, N.D. Mermin (Saunders's College, New York, 1975); *Introduction to Solid State Theory* ed. by O. Madelung (Springer, Berlin, Heidelberg, New York, 1978); and *Fundamentals of Semiconductors* ed. by P.Y. Yu, M. Cardona (Springer, Berlin, Heidelberg, New York, 1995).

Many graduate students at Brown, Tennessee, and Pusan have helped to improve these lecture notes by pointing out sections that were difficult to understand, and by catching errors in the text. Dr. Alex Tselis presented the authors with his carefully written notes of the course at Brown when he changed his field of study to medical science. We are grateful to all the students and colleagues who have contributed to making the lecture notes better.

Both the co-authors want to acknowledge the encouragement and support of their families. The book is dedicated to them.

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