"Seitz-schrift" or Seitz-Turnbull series (Solid State Physics—Advances in Research and Applications), which is probably the best single source at this point. Kittel's book is very good, but except possibly in the one field of crystal symmetry in the second edition, it is not very complete on any one subject. Special areas are covered reasonably well in certain books—e.g., Ziman's "Electrons and Phonons" (3) and other books on special subjects such as dislocations, magnetic resonance, etc. Wannier's "Elements of Solid State Theory" (4) and Peierls' book (5) should be mentioned, each of which is probably the result of some such selection as will be made here, but a quite different one. A magnificent, but quite advanced, and quite condensed text is Landau and Lifshitz' "Statistical Physics" (6). A forthcoming text which will cover a very wide area of solid-state physics from the point of view of group theory and symmetry principles will be M. Lax, "Symmetry Principles in Solid-State Physics" (6a). In any case, books and articles used for sources in any given area will be mentioned.

## B. PLAN OF THE COURSE

1. First some general ideas about solid-state physics, including the classification of solids into types, and some broadly general things about the quantum chemical facts we might hope to explain from a deeper point of view: occurrence, properties, etc., of the different types.

2. The next and possibly most important and fundamental area is the purely one-electron band theory, since probably most of the basic questions such as binding, symmetry, band structures, etc., are primarily determined by the bands.

What we hope to lead up to, via some study of the older methods and results, are the more recent ideas of Phillips, Cohen, Heine, and others about the success of the almost-free electron model, and some of the speculations one can then make about binding-energy trends and the quantum chemistry of solids.

Another subject will be the modern developments in one-electron band theory in the presence of perturbations, external fields, impurities, etc.: i.e., effective mass theory.

3. Next we comment on the reason why such manifest oversimplifications as the one-electron theory discussed above work—namely, the idea of elementary excitations, probably the single most fruitful theoretical concept in all of solid-state physics. After discussing the theoretically simple case of insulators and the less simple case of metals, we go on to discuss various possible kinds of collective elementary excitation—excitons, spin waves, and phonons. There are also some more general remarks about collective excitations which apply to all of these.

4. In discussing spin waves we shall treat magnetism. Here the fundamental questions are why and when materials are magnetic—the question of the magnetic state, or when free spins occur—and what causes the interactions among the spins which lead to ferro- or antiferromagnetism. We shall also use this as an example of some general facts about condensation.