



<b>Phys 3401</b>	<b>SOLID STATE PHYSICS-I</b>	<b>(CR3)</b>
<b>Preq.</b>	<b>Phys 2002</b>	

### Objectives

*This course deals with basic principles and techniques of solid state physics.*

### Syllabus

Crystal structure, periodic arrays of atoms, fundamental types of lattices, index system for crystal planes, simple crystal structures, direct imaging of atomic structure, non-ideal crystal structures, reciprocal lattice, diffraction of waves by crystals, scattered wave amplitude, Brillouin zones, Fourier analysis of the basis, quasi crystals, crystal binding and elastic constants, crystals of inert gases, ionic crystals, covalent crystals, metals, hydrogen bonds, analysis of elastic strains, elastic compliance and stiffness constants, elastic waves in cubic crystals, vibrations of crystals with monatomic basis, two atoms per primitive basis, quantization of elastic waves, phonon momentum, inelastic scattering by phonons, Phonon heat capacity, anharmonic crystal interactions, thermal conductivity, electronic heat capacity, noncrystalline solids, diffraction pattern, glasses, amorphous ferromagnets and semiconductors.

### Recommended Books

1. *Introduction to Solid State Physics* by C. Kittel (8<sup>th</sup> Edition), Wiley (2012).
2. *Solid State Physics* by N. W. Ashcroft and D. Mermin, CBS Publishing (1987).
3. *Solid State Physics* by J. S. Blakemore, Cambridge (1991).
4. *Solid State Physics* by M. A. Wahab, Narosa Publishing House (1999).
5. *Physics of Solids*, by J. B. Ketterson, Oxford, (2016).
6. *Elementary and Solid State Physics* by M. A. Omar, Pearson (2000).