MATRL 218: Introduction to Inorganic Materials

Catalog Description:

This course introduces typical inorganic materials, with an emphasis on crystalline materials (some discussion of quasicrystalline and amorphous materials) and how their intrinsic material properties (as opposed to properties dictated by defects *etc.*) can be understood based on the constituent atoms, and the crystal and electronic structures. Includes rudiments of crystallography, and notions of how crystal structures can be considered from the concepts of close-packing, and of the linking of polyhedra. Some discussion of specific structure types with reference to advanced material properties such as metallic *vs.* insulating behavior, magnetism, ferroic properties, and superconductivity.

Target audience:

The course is for graduate students with some prior knowledge of inorganic materials and crystallography. Advanced undergraduate students are welcome. Materials 100A would be a typical pre-requisite.

Textbooks (none are required):

The Basics of Crystallography and Diffraction, C. Hammond, Oxford-IUCr, 1997. ISBN 0-19-855945-3 (or newer editions)

Electronic Structure and Chemistry of Solids, P. A. Cox, Oxford University Press, 1987. ISBN 0-19-855204-1

Inorganic Structural Chemistry, U. Müller, John Wiley, 1993. ISBN 0-471-93717-7

Crystal structures: A Working Approach, H. D. Megaw, W. B. Saunders, 1973. ISBN 0-721-66260-9

Structure of Materials, M De Graef and M. E. McHenry, Cambridge University Press, 2 edition, 2012.

Course Website:

http://www.mrl.ucsb.edu/∼seshadri/teach.html