Self-assembly is one of the most exciting topics in current nanotechnology research. Crude directions and vague instructions given by humans can evolve simply into precisely assembled and positioned nanostructures that can exhibit unusual geometries and functions. This bottom-up process is quite unlike the traditional engineering approach of top-down assembly which requires extremely precise and expensive lithography tools such as electron beam pattern generators or x-ray exposure tools. Self-assembly results from energetically favorable reactions. Therefore, principles of thermodynamics and, to a lesser degree, kinetics can be used to develop an intuition for when self-assembly can be expected to occur. In this course we will review these fundamentals and examine how they are being applied in a number of current research projects both at UofL and around the world.

Main texts: Gordon, *Principles of Phase Diagrams*  
Porter and Easterling, *Phase Transformations*  
Individualized readings by each student of the current literature

Course info: ECE 675  
2:00 - 2:50 MWF

Taught by: R. W. Cohn, Professor and Director  
ElectroOptics Institute & Nanotechnology Center  
Shumaker Research Bldg., Rm. 245  
852-7077, rwcohn@louisville.edu

*Students from all engineering departments, physics, chemistry, biology and molecular biology would find this course to be useful and are invited to attend.*

Note: RWC plans to reoffer Nanostructure Self-Assembly II sometime between Su2014 and Su2015, with coverage principally of Isrealachvilli, *Intermolecular and Surface Forces.*